WINONA STATE UNIVERSITY
PROPOSAL FOR NEW COURSES

Department ___________ GEOSCIENCE __________________________ Date ________ 10/4/2004 __________

Course No. ___________ 108 ___________ Course Name GEOLOGY OF THE MISSISSIPPI RIVER ___________ 3 Credits

This proposal is for a(n) ____ 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 SPRING SEMESTERS ____

*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:

__Toby Dogwiler______________________________ _____5267_______ __tdogwiler@winona.edu_____

Name (please print) _______ Phone _______ e-mail address
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 with 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 will be an addition to our introductory geoscience pool. No other geoscience courses will be dropped to accommodate this course. However, if this course is approved as a Science and Social Policy requirement, it will provide an alternate choice (to Geos 103 Natural Disasters and Geos 102 Resources of the Earth) for students seeking an introductory course to satisfy that University Studies category.

   Currently, Natural Disasters is taught fall and spring semesters as “mega-sections”, two 60-seat sections of Resources of the Earth are offered in the fall, and one 60-seat section of Meteorology (Geos 115) has been taught each of the last two spring semesters. As this course is introduced into the geoscience introductory rotation, these courses may be taught somewhat less frequently.

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 have no effect on departmental supplies. All equipment necessary to teach this course is currently available in the Department of Geoscience.
Routing form for new and revised courses and programs. Course or Program: GEOLOGY OF THE MISSISSIPPI RIVER

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Please forward to Registrar.

Registrar | Date entered
Please notify department chair via e-mail that curricular change has been recorded.
A. Course Description

1. Catalog Description
108 – Geology of the Mississippi River—3 S.H.
Investigation of the geologic history, river processes, and resource management of large rivers, particularly focusing on the Mississippi River. Topics covered will include an exploration of the relationship between the Mississippi River and its watershed, soils, groundwater, bedrock geology, and humans. Concepts emphasized will include the hydrologic cycle, plate tectonics, river morphology, river dynamics, resource management, and public policy issues. Lecture, no laboratory. Offered alternate years. No Prequisites.

2. Course Outline
This course will cover the geology of large river basins. Primarily we will focus on the Mississippi River and its watershed. However, we will also compare the Mississippi River to other large rivers in the world.

1) Introduction to the Mississippi River
   a) Brief geographic setting
      i) Watershed size
      ii) Demographics
         (1) Human interactions with the river
   b) Brief geologic setting
      i) Age of the river
      ii) Pre-glacial history
         (1) Geology of the mid-continent
            (a) Rifting in the Mississippi Embayment
      iii) Post-glacial history
         (1) The modern river valley
            (a) Investigation of the Winona-area geology and stratigraphy

2) Watershed Fundamentals
   a) What is a drainage basin?
   b) Relationship between river, soils, groundwater, lakes, and humans

3) Hydrologic cycle
   a) Climate of the Mississippi River watershed
      i) Where the water comes from
         (1) Where the water might go??
            (a) Water as a commodity
   b) Residence Times
   c) Water Quantity
   d) Comparison to other large rivers

4) How Rivers Work
   a) River morphology
      i) Longitudinal profile
      ii) Channel forms
         (1) Braided, Meandering, etc.
      iii) Drainage networks

   (1) Dendritic, radial, trellis, etc.
   b) River dynamics
      i) Equilibrium
      ii) Floodplain processes
         (1) Meandering
   c) Depositional processes
      i) Fluvial sediments
         (1) Composition
         (2) Sorting
         (3) Structures
         (4) Environments
   d) Erosional processes
      i) Channel migrations
   e) Fluid mechanics
      i) Shear stress

5) Resource Management
   a) Environmental Issues
      i) Water Quality
      ii) Sediment contaminants
   b) River Engineering
      i) Corp of Engineers
         (1) Congressional Charge
         (2) History
      ii) Strategies
      iii) Structures
         (1) Advantages/Disadvantages
      iv) Large River engineering in other countries
         (1) How has US policy influenced or guided Chinese (Three Gorges project) and Bangladeshi policies
      v) Policy and long-term planning

3. Basic Instructional Plan and Methods &
4. Course Requirements
   Primarily, this course will be lecture and discussion-based.

Assessment
Grading: A > 90%; B 80-89; C 70-79; D 60-69; F <60 (Must take for a letter grade)
Exams (3) 55%

Final exam will be semi-comprehensive
Letter to the Editor  
This assignment will require you to write a position statement, in the form of a letter to the editor, regarding some issue related to the Mississippi River.

Homework  
You will have a variety of homework assignments. These assignments will require you to quantitatively analyze real data about the river and then discuss how these data can guide policy makers in managing and regulating the river. An example will be the EarthInquiry: Recurrence Interval of Floods assignment. For this assignment you will obtain discharge data for the Mississippi River and then use those data to calculate the recurrence interval of different magnitude floods. Based on the results, you will be asked to discuss how these data should influence floodplain management.

Pop Quizzes  
Quizzes will cover the material in reading assignments.

Class Participation/Discussion/Misc  

Total  

5. Course Materials

Required Texts
Custom Publication from McGraw-Hill Publishers. There is not an available textbook that focuses on the geology of the Mississippi River. Thus, I have arranged to have chapters from various textbooks and readers compiled into a custom publication. The included chapters cover geological concepts, essays by people who work on or study the river, and social and political policy issues related to rivers.


6. List of References

Additional Resources


B. Rationale

1. Statement of the major focus and objectives of the course
The major focus of this course is to provide non-science majors a scientific perspective and understanding of the geologic processes and concepts that govern large rivers—particularly the Mississippi.
River. The geology of the Mississippi River will be explored at a watershed scale and the relationship of the river with the river valley, including the bedrock geology, soils, and groundwater will be examined. The role of humans in shaping the river, as we know it today, will also be considered with regard to public policy and resource management issues.

Embedded in this focused study of the river will be discussion of related fundamental geological principles such as plate tectonics, the hydrologic cycle, and sedimentary processes that are commonly covered in all introductory geoscience courses.

2. **Specify how this new course contributes to the departmental curriculum**
   
   As described in the *Financial and Staffing Data Sheet* this course will add a new topical course to the Geoscience Department introductory pool. This is in line with other departmental curriculum revision goals of teaching more topical courses that focus more deeply on a narrower scope of concepts than the traditional introductory physical geology course which covers topics “a mile-wide, and an inch deep”.

   This course is also being developed, in part, because of encouragement from faculty members involved in the development of the Mississippi Rivers Studies program. These colleagues believe that scientific perspectives, particularly geologic and biologic, of the river are crucial components of this program. This course will provide a geological examination of the Mississippi River and the commonalities it shares with other large rivers of the world.

3. **Indicate any course(s) which may be dropped if this course is approved**
   
   No other courses will be dropped if this course is approved.

C. **Impact of this Course on other Departments, Programs, Majors, or Minors**

1. **Does the course increase or decrease the total credits required by a major or minor of any other department?**
   
   No. This course will not affect the credit requirements of any department, program, major, or minor.

2. **List the departments, if any, which have been consulted about this proposal.**
   
   No departmental-level notifications have been made regarding this proposal. However, faculty from the Residential College, History, Mass Communications, and Theater and Dance who are involved in the development of the Mississippi Rivers Studies program have been notified about this proposal.

D. **University Studies Course Proposals**

This course is also being submitted for consideration as a Science and Social Policy course under the Unity and Diversity requirement.