Minneapolis State University, Mankato
Curriculum Proposal

Please type or select the requested information. Print completed forms, add appropriate paper attachments, and route through MSU's curricular process for recommendations and decisions.

**College:** Science, Engineering and Technology  
**Department:** Chemistry and Geology  
**Program:** CIP #

<table>
<thead>
<tr>
<th>Proposal #</th>
<th>116</th>
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<tbody>
<tr>
<td>Effective Date of Change:</td>
<td>(For Office Use Only)</td>
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<tr>
<td>Academic Year</td>
<td>2008-09</td>
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<table>
<thead>
<tr>
<th>Course Designator and Number</th>
<th>Number of Credits</th>
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<tr>
<td>GEOL 320</td>
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*(if applicable)*

Include a course or program description for the Bulletin (30-40 words maximum for courses, 100 for programs):

GEOL 320 (3) Sedimentology and Stratigraphy

Focused studies of the origins and processes of transportation, deposition, burial, and diagenesis of sedimentary materials. Controls on sediment deposition, characteristics of sedimentary assemblages, and regional distribution will be discussed using theory and investigative methods from petrographic to seismic.

Pre: GEOL 121

**Rationale or Justification for change:**

See attached justification.

***For General Education or Cultural Diversity Courses Only***

<table>
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<th>GE Category #</th>
<th>GE Category Name (Maximum of 3 Categories)</th>
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* For Writing Intensive Courses, attach a description of the kind and quantity of writing.
* For Upper Division Courses, include a description of the respects in which it is broad and general rather than narrow and specific, and so suitable as GE.

Attach paper copies of the following:

- a. Syllabus or course outline.
- b. Course's student learning outcomes associated with each GE competency or CD designation.
- c. List of strategies to be used to assess students' achievement of each GE competency or CD designation.

***For New Courses***

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<tr>
<th>Instructional Type:</th>
<th>Lecture</th>
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<tr>
<td>Course is an elective.</td>
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<td>Course is required for program</td>
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<tr>
<td>Pre- or Co-requisites:</td>
<td>GEOL 121</td>
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<tr>
<td>Other courses are being changed or eliminated. (Explain.)</td>
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Three of four contact hours in GEOL 479 will be transferred to non-Geology staff.

<table>
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<tr>
<th>Course will be offered:</th>
<th>Fall Semester</th>
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<td>X</td>
<td>Spring Semester</td>
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<td></td>
<td>Summer Session</td>
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* Course content or title is similar to courses in other departments. (Attach copy of letter of agreement with other program(s) contacted. Indicate the nature of the discussions and/or resolution of differences or potential conflicts.)*

Attach paper copies of the following:

- a. Syllabus or course outline.
- b. Course's student learning outcomes.
- c. A list of resources required to offer and support this course.
- d. A description of how teaching this course will affect department staffing.
- e. If 400/500 level course, an explanation of added expectations of graduate students.
## Minnesota State University, Mankato Curriculum Proposal

### Signature Page

<table>
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<tr>
<th>Department</th>
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**Department Chair**

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**Committee Chair**

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**Dean**

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**General Education Subcommittee Chair**

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**UCAP Faculty Chair**

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**Faculty Association Graduate Chair**

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**Graduate Dean**

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**Assistant Vice President**

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**Sr. Vice President / Vice Pres. Academic Affairs**
Geology 320, Sedimentology and Stratigraphy Course Proposal Appendix

A. Sample Course Syllabus

Minnesota State University, Mankato

Geology 320 Sedimentology and Stratigraphy

Overview: Focused studies of the origins and processes of transportation, deposition, burial, and diagenesis of sedimentary materials. Controls on sediment deposition, characteristics of sedimentary assemblages and regional distribution will be discussed using theory and investigative methods from petrographic to seismic.

Instructor Contact Information:

Instructor: TBA
Phone: TBA
Office: TBA
Email: TBA
Office Hours: TBA


Meeting Schedule:

Regular lectures: 3, 50-minute lectures per week.
Field Trips: 2, ½-day field trips offered on two separate Saturdays during the term.

Outline of Content:

WEEK CONTENT
1 Introduction; Origin of Sedimentary Materials
2 Transportation and Deposition of Siliciclastic Sediments
3 Deposition of Non-siliciclastic Sediment
4 Sedimentary Textures and Structures
5 Composition and Distribution of Sedimentary Rocks
6 Field Trip (Class times banked to offset Saturday field trip)
7 Diagenesis
8 Sedimentary Environment Interpretation and Classification
9 Continental Environments
10 Marginal Marine Environments
11 Marine Environments
12 Physical Stratigraphy
13 Biostratigraphy
14 Field Trip (Class times banked to offset Saturday field trip)
15 Chronostratigraphy, Chemostratigraphy, and Seismic Stratigraphy

Student Learning Outcomes:

1. Students will be able to recognize and discuss the processes through which sediments are formed, transported, and deposited by chemical and mechanical processes;
2. Students will identify and describe the methods used to describe sedimentary rocks and deposits;
3. Students will list and describe the qualifying chemical, physical, and biological attributes of all major sedimentary environments;
4. Students will utilize litho, chemo, and seismic stratigraphic methods to characterize the vertical and lateral distribution of sedimentary deposits;
5. Students will synthesize major sedimentary concepts to reconstruct sediment accumulation histories in sedimentary basins.

Assessment:

Lecture examinations: Two mid-terms (@ 15% course grade each) and one comprehensive final exam (@ 25% course grade).
Field trip report: Summary report of findings will be evaluated; report value is 15% of final grade.
Final project: Detailed study of a sedimentary or stratigraphic concept utilizing office, field, or laboratory techniques applied to an existing or emerging issue. The value of the project is 30% of the final grade.
B. Outcomes and Assessment

a. Program outcomes

1. Provide students with high quality instruction across the breadth of the earth sciences;
2. Produce scholarly achievement in the earth sciences that advances the current understanding of earth materials and processes among local, national, and international students and practitioners of earth science;
3. Facilitate student learning and development by integrating applications of concepts to real-world problems, and through attentive student advising as well as close support of research designed for student learning and development;
4. Maintain and develop instructional and research infrastructure required for program operations;
5. Provide expert service to the various local, regional, and national communities served by the earth science faculty and students.

Proposed Earth Science (Geology Option) program outcomes

1. Provide students high quality focused instruction in the geological aspects of the earth sciences;
2. Produce scholarly achievement in the geological aspects of the earth sciences;
3. Facilitate student learning and development through expanded learning opportunities, superior student advising, and active undergraduate research initiatives that focus on geological aspects of earth science;
4. Maintain and develop instructional and research infrastructure supporting geological instruction and research within the earth science program;
5. Provide service to the various local, regional, and national communities served by the faculty and students of the Geology Option of the Earth Science major.

b. Student learning outcomes

1. Students will be able to recognize and discuss the processes through which sediments are formed, transported, and deposited by chemical and mechanical processes;
2. Students will identify and describe the methods used to describe sedimentary rocks and deposits;
3. Students will list and describe the qualifying chemical, physical, and biologic attributes of all major sedimentary environments;
4. Students will utilize litho-, chemo-, and seismic stratigraphic methods to characterize the vertical and lateral distribution of sedimentary deposits;
5. Students will synthesize major sedimentary concepts to reconstruct sediment accumulation histories in sedimentary basins.

c. Methods of assessment

1. Students will complete two mid-term exams and one comprehensive final exam consisting of essay-style questions related to aspects of the course content. The sum of exams will constitute 55% of the total student grade;
2. Students will participate in two field trips to local exposures of sedimentary rocks and complete in-field descriptive sedimentology as well as follow-up reports discussing the attributes, depositional history, and post-depositional alterations of the strata under investigation. Field trip participation and follow-up reporting will constitute 15% of each student's grade;
3. Students will complete one research project consisting of either field and laboratory investigations or basic literature review-style research. The value of the research project will be 30% of the total course grade.

C. Course Description Used for Bulletin Copy

Geol 320 (3) Sedimentology and Stratigraphy

Focused studies of the origins and processes of transportation, deposition, burial, and diagenesis of sedimentary materials. Controls on sediment deposition, characteristics of sedimentary assemblages and regional distribution will be discussed using theory and investigative methods from petrographic to seismic.

Pre: Geol 121
D. Required Resources

A lecture classroom will be required for all meetings except those associated with field trips. Field trips will require the use of a university van to provide transportation to the local field study area.

E. Staffing Impact

Geology 320, Sedimentology and Stratigraphy will cause no net impact on staffing. The addition of this course to the MSU Mankato curriculum is part of a larger proposal to add a Geology Option to the Earth Science major at MSU Mankato. Refinements to the geology course and laboratory schedule completed within the Department of Chemistry and Geology during September 2006 allow the new core course to be offered annually within the constraint of maintaining a maximum annual contact hour load of 72 hours for the three geologists on staff.

F. Justification

a. Sedimentology and stratigraphy is one of the cornerstones of geoscience education and practice. It is required for accreditation and nearly every major college and university in America offers its content in one form or another.

b. Because sedimentology and stratigraphy focuses on the origins, depositional controls, and distribution of many surface and near-surface earth materials, knowledge of this subject is requisite for success in the three largest practices in geology: environmental geology, hydrogeology, and petroleum geology.

G. Student Audience

Geology 320, Sedimentology and Stratigraphy is designed primarily for students seeking the Geology Option of the Earth Science major. We anticipate a small number (i.e., four to eight students) of existing Earth Science majors will convert to the Geology option. The small number is anticipated because of the additional needs of math, chemistry, and physics required by the Geology Option that most Earth science majors will not elect to take. Because the Earth Science major allows students to take numerous electives in addition to their required coursework, we do not anticipate the addition of the Geology Option, or specifically the Sedimentology and Stratigraphy course, will have any negative impact on any existing geography/Earth science course. That is, we expect students will elect to take the new course in addition to those already included in their plans of study.

The larger pool of students, i.e., eight to ten students, that we anticipate will enroll in Geology 320 will be new students drawn to Minnesota State Mankato by the newly initiated geology option. Thus, they will represent additional student credit hours for the university, college, and specifically, the Department of Chemistry and Geology.

H. Effect on Requirements of Other Programs

Geology 320, Sedimentology and Stratigraphy is a new course linked to the proposed Earth Science Geology Option to the undergraduate curriculum at Minnesota State Mankato. A separate proposal for this Option has been submitted to the College of Social and Behavioral Sciences Curriculum Committee. The earth science major will be amended to include both an Earth Science B.S. and Earth Science (Geology) B.S. The credit requirement Earth Science B.S. will be unaffected by the addition of the geology option and thus, the addition of Geology 320 will not affect that program.