

08-7j

LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No. <u>07-43j</u>	UWUCC Action-Date: <u>App-1/29/09</u>	Senate Action Date: <u>App-2/24/09</u>
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Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person Michael A. Poage	Email Address mpoage@iup.edu
Proposing Department/Unit Geosciences - Natural Sciences and Mathematics	Phone 724-357-5627

Check all appropriate lines and complete information as requested. Use a separate cover sheet for each course proposal and for each program proposal.

1. Course Proposals (check all that apply)

New Course Course Prefix Change Course Deletion

Course Revision Course Number and/or Title Change Catalog Description Change

<i>Current Course prefix, number and full title</i>	<i>Proposed course prefix, number and full title, if changing</i>
	GEOS 201 Foundations of Geology

2. Additional Course Designations: check if appropriate

This course is also proposed as a Liberal Studies Course. Other: (e.g., Women's Studies, Pan-African)

This course is also proposed as an Honors College Course.

3. Program Proposals

New Degree Program Program Title Change Program Revision

New Minor Program New Track Other

<i>Current program name</i>	<i>Proposed program name, if changing</i>
CS	

4. Approvals		Date
Department Curriculum Committee Chair(s)		2/4/08
Department Chair(s)		2/4/08
College Curriculum Committee Chair		2-11-08
College Dean		2-11-08
Director of Liberal Studies *		3-27-08
Director of Honors College *		
Provost *		
Additional signatures as appropriate: (include title)	Joseph Domaradei, TELC	1-26-09
	Mary Ann Rajath, Dean COE-ET	1-26-09
UWUCC Co-Chairs		Received FEB 24 2009

* where applicable

SEP 25 2008

LIBERAL STUDIES COURSE APPROVAL, PARTS I-III: GENERAL INFORMATION CHECK-LIST

I. Please indicate the LS category(ies) for which you are applying:

LEARNING SKILLS:

First Composition Course Second Composition Course
 Mathematics

KNOWLEDGE AREAS:

<input type="checkbox"/> Humanities: History	<input type="checkbox"/> Fine Arts
<input type="checkbox"/> Humanities: Philos/Rel Studies	<input type="checkbox"/> Social Sciences
<input type="checkbox"/> Humanities: Literature	<input type="checkbox"/> Non-Western Cultures
<input checked="" type="checkbox"/> Natural Sci: Laboratory	<input type="checkbox"/> Health & Wellness
<input type="checkbox"/> Natural Sci: Non-laboratory	<input type="checkbox"/> Liberal Studies Elective

II. Please use check marks to indicate which LS goals are primary, secondary, incidental, or not applicable. When you meet with the LSC to discuss the course, you may be asked to explain how these will be achieved.

Prim Sec Incid N/A

- | | |
|--|--|
| <input checked="" type="checkbox"/> _____ | A. Intellectual Skills and Modes of Thinking: |
| <input type="checkbox"/> <input checked="" type="checkbox"/> _____ | 1. Inquiry, abstract logical thinking, critical analysis, synthesis, decision making, and other aspects of the critical process. |
| <input type="checkbox"/> <input checked="" type="checkbox"/> _____ | 2. Literacy--writing, reading, speaking, listening. |
| <input type="checkbox"/> _____ <input checked="" type="checkbox"/> _____ | 3. Understanding numerical data. |
| <input checked="" type="checkbox"/> _____ | 4. Historical consciousness. |
| <input type="checkbox"/> <input checked="" type="checkbox"/> _____ | 5. Scientific Inquiry. |
| <input type="checkbox"/> _____ <input checked="" type="checkbox"/> _____ | 6. Values (Ethical mode of thinking or application of ethical perception). |
| <input checked="" type="checkbox"/> _____ | 7. Aesthetic mode of thinking. |
| <input type="checkbox"/> _____ <input checked="" type="checkbox"/> _____ | B. Acquiring a Body of Knowledge or Understanding Essential to an Educated Person |
| <input type="checkbox"/> _____ <input checked="" type="checkbox"/> _____ | C. Understanding the Physical Nature of Human Beings |
| <input type="checkbox"/> _____ <input checked="" type="checkbox"/> _____ | D. Collateral Skills: |
| <input type="checkbox"/> <input checked="" type="checkbox"/> _____ | 1. Use of the library. |
| <input type="checkbox"/> <input checked="" type="checkbox"/> _____ | 2. Use of computing technology. |

III. The LS criteria indicate six ways that courses should contribute to students' abilities. Please check all that apply. When you meet with the LSC, you may be asked to explain your check marks.

- 1. Confront the major ethical issues that pertain to the subject matter; realize that although "suspended judgment" is a necessity of intellectual inquiry, one cannot live forever in suspension; and make ethical choices and take responsibility for them.
- 2. Define and analyze problems, frame questions, evaluate available solutions and make choices.
- 3. Communicate knowledge and exchange ideas by various forms of expression, in most cases writing and speaking.
- 4. Recognize creativity and engage in creative thinking.
- 5. Continue learning even after the completion of their formal education.
- 6. Recognize relationships between what is being studied and current issues, thoughts, institutions, and/or events.

Liberal Studies Course Approval Part IV

A. This course will be taught in one section by one instructor.

B. Readings taken from Vassar College Professor Jill S. Schneiderman's collection of essays entitled "The Earth Around Us: Maintaining a Livable Planet" [W.H. Freeman and Company: New York, 2000, 455p.; ISBN 0-7167-3397-8] will highlight the important contributions that this and other female scientists have made to conveying modern science to a broad audience (see "C" below). Other authors of essays in this collection include Marcia Bjornerud (Lawrence University), Allison McFarlane (George Mason University), Cathryn Manduca (Carelton College), Kirsten Menking (Vassar College), Naomi Oreskes (University of California at San Diego), and Jill Singer (Buffalo State University).

C. In addition to the textbook "Earth: An Introduction to Physical Geology", a number of non-textbook readings will be incorporated into the course from the above-mentioned collection of essays, "The Earth Around Us: Maintaining a Livable Planet". Essays in this collection address the interactions of humans and planet Earth in a discussion of modern environmental issues. Essay titles include:

"From the Catskills to Canal St.: New York City's Water Supply"

"Ruling the Range: Managing the Public's Resources"

"Are Soils Endangered?"

"An Earth Scientist in City Hall: Geology and Community"

"Lessons from the Past for Future Climate"

"Geology and Environmental Justice: An example from Hawaii"

D. This course as well as GEOS 203 (see attached proposal) will draw on elements of the geosciences pertinent to understanding the interactions between the lithosphere, biosphere, hydrosphere and atmosphere. As such, this course will focus on the fundamental systems that constitute our planet as well as the internal processes that shape our planet. The content will set the stage for GEOS 203 Surficial Processes. The emphasis on Earth systems and processes and the resulting rock products is designed to provide a working knowledge of the Earth Sciences that will be readily transferable to a variety of academic as well as career paths, including but not limited to: agriculture, economics, anthropology, geography, safety science and history.

CHECK LIST -- NATURAL SCIENCES (Laboratory)

Knowledge Area Criteria which the course must meet:

- Treat concepts, themes and events in sufficient depth to enable students to appreciate the complexity, history and current implications of what is being studied; and not be merely cursory coverage of lists of topics.
- Suggest the major intellectual questions/problems which interest practitioners of a discipline and explore critically the important theories and principles presented by the discipline.
- Allow students to understand and apply the methods of inquiry and vocabulary commonly used in the discipline.
- Encourage students to use and enhance, wherever possible, the composition and mathematics skills built in the Skill Areas of Liberal Studies.

Natural Science Criteria which the course must meet:

- Examine a body of knowledge of natural science that will contribute to an understanding of the natural world.
- Provide an understanding of the development of natural science theories and their modification.
- Teach students to formulate and test hypotheses.
- Provide an understanding of some of the "great moments" in the history of natural science and the individuals, including women and minorities, responsible for them.

Natural Science Laboratory Criteria which the course must meet:

- Provide students with opportunities to learn and apply data-gathering techniques.
- Provide students with opportunities to develop skills in making accurate observations, in formulating concise and appropriate descriptions of natural phenomena, and in producing meaningful systems of classification for natural objects.
- Provide students with opportunities to apply theories to practice in the working world of science.

Additional Natural Science Criteria which the course should meet:

- Encourage an appreciation of the complex interrelationship of natural science with the life of the individual.
- Develop in students the abilities necessary to cope with the consequences of natural science in the modern world.
- Develop an inquiring attitude consistent with the tenets of natural sciences, an attitude that is willing to expose fallacy on the basis of reason, that demands evidence for scientific assertions, and yet is tolerant of hypotheses in the absence of contradictory evidence.

Part II. Description of Curricular Change

1. SYLLABUS OF RECORD

I. Catalog Description

GEOS 201 Foundations of Geology

3 class hours
3 lab hours
4 credit hours
(3c-3l-4cr)

Prerequisite: Geoscience majors and minors, and Science or Science Education majors/minors, Anthropology, Geography and Regional Planning majors, or permission of instructor

An introduction to the geological sciences including the study of the Earth's interior, plate tectonics, minerals and crystallography, igneous, sedimentary and metamorphic rocks and their cycling, geologic time, crustal deformation and earthquakes. Laboratory exercises will emphasize hands-on learning of basic geology skills including mineral and rock identification, understanding the geometry of subsurface geologic structures, and topographic and geologic map reading.

II. Course Objectives

At the end of this course students will be able to:

- 1) Recognize the Earth as a complex system of interacting components including the hydrosphere, atmosphere, biosphere and the lithosphere.
- 2) Explain the major features of the continents and ocean floor.
- 3) Synthesize data from a variety sources into an understanding of different plate tectonic settings
- 4) Summarize the principles of relative and absolute geologic time and evaluate the history of rock outcrops
- 5) Compare and contrast the common minerals in the Earth on the basis of chemical composition, physical properties, and bonding structure.
- 6) Demonstrate a fundamental understanding of the rock cycle and the geologic processes responsible for creating the common igneous, sedimentary and metamorphic rocks of the world
- 7) Demonstrate a fundamental understanding of rock deformation, geologic structures, earthquakes and seismology, and crustal movements
- 8) Synthesize information about rock deformation, geologic structures, earthquakes and seismology, and crustal movements into a description of tectonic plate boundaries and the evolution of continents.
- 9) Identify rocks and minerals in hand specimen using their physical and chemical properties
- 10) Use the petrographic microscope in identifying minerals and rocks.
- 11) Interpret topographic and geologic maps and synthesize a region's geologic history from these maps.

Student outcomes assessment matrix:

Conceptual Framework (Danielson Domain)	Content Standard (NSTA Science Teacher Preparation)	Course Objective	Assessment (*denotes assessment for reporting)
1	1b	1	Final Exam
1	1a	2	*Plate Tectonics Lab, Final Exam
1	1a, 3a	3	Plate Tectonics Lab, Exam 1
1, 3	1a, 1b, 2b, 3a	4	*Geologic Time Lab, Exam 1
1	1a	5	Mineral Labs, Exam 1

1	1a, 1b	6	Rock Labs, Exam 2
1	1a	7	Earthquake Lab, Geologic Structure Lab, Final Exam
1, 3	1a, 3a	8	Final Exam
1	1a	9	Mineral and Rock Labs
1	1a	10	Mineral and Rock Labs
1	1a, 3a	11	*Topographic and Geologic Maps Lab

III. Course Outline

Lecture

Part A (3 academic hours): Introduction to Geology

1. The Science of Geology and the Nature of Scientific Inquiry
2. The Earth as a System: Hydrosphere, Atmosphere, Biosphere and Solid Earth
3. Early Evolution of the Earth and Earth's Internal Structure
4. Major Features of the Continents and Ocean Floor
5. Geologic Time and the Rock Cycle

Part B (3 academic hours): Plate Tectonics

1. Alfred Wegener and Continental Drift
2. Earth Magnetism and the Birth of Plate Tectonics
3. Plate Boundaries: Divergent, Convergent and Transform
4. Measuring Plate Motion
5. The Driving Forces Behind Plate Tectonics

Part C (3 academic hours): Geologic Time

1. Principles of Relative Age Dating, Correlation of Rock Layers
2. Types of Fossils, Conditions Favoring Preservation, Fossils and Stratigraphic Correlation
3. Radiometric Age Time and Absolute Time
4. The Geologic Time Scale and Earth History

Part D (5 academic hours): Matter and Minerals

1. Structure of Atoms, Elemental Bonding
2. Structure and Physical Properties of Minerals
3. The Silicate Tetrahedron and Silicate Minerals
4. Non-Silicate Minerals: Carbonates, Sulfates, Halides, Sulfides, Oxides, Hydroxides

Exam 1 (1 academic hour)

Part E (14 academic hours): Rocks

1. Igneous Rock Types Igneous Textures, Origin of Magma, Crystallization of Magmas, Naming Igneous Rocks
2. Volcanoes, Nature of Volcanic Eruptions, Volcanic Rocks, Intrusive Igneous Bodies, Plate Tectonics and Igneous Activity, Volcanic Hazards
3. Chemical vs. Mechanical Weathering, Rates of Weathering, Detrital vs. Chemical Sedimentary Rocks, Sedimentary Facies and Environments
4. Agents of Metamorphism, Metamorphic Textures, Metamorphic Rocks, Metamorphic Zones and Environments, Plate Tectonics and Metamorphism

Exam 2 (1 academic hour)

Part F (12 academic hours): Crustal Deformation, Earthquakes and Tectonic Settings

1. Rock Deformation, Geologic Structures, Graphical Representation of Geologic Structures, Geologic Maps
2. Earthquakes, Seismology, Earthquake Hazards, The Earth's Interior
3. Origin and Evolution of the Ocean Floor, Passive and Active Continental Margins, Origin and Destruction of Oceanic Lithosphere, The Supercontinent Cycle
4. Evolution of the Continents, Mountain Building and Continental Collisions, Vertical Crustal Movements

Final exam during final exam period.

Laboratory Exercises (3 academic hours each)

Week 1:	Introduction to Earth Systems
Week 2:	Plate Tectonics
Week 3:	Geologic Time
Week 4:	Physical Properties of Minerals
Week 5:	Mineral Identification
Week 6:	Optical Mineralogy
Week 7:	Igneous Rock Identification and Petrography
Week 8:	Sedimentary Rock and Fossil Identification and Petrography
Week 9:	Metamorphic Rock Identification and Petrography
Week 10:	Interpretation of Fossil and Rock Distributions
Week 11:	Geologic Structures
Week 12:	Earthquake Mechanics
Week 13:	Topographic and Geologic Maps
Week 14:	Synthesis Exercises

IV. Evaluation Methods

Each component of the course will contribute to final grade according to:

Exam 1	20%
Exam 2	20%
Final Exam	20%
Laboratory Exercises	<u>40%</u>
Total	100%

V. Example Grading Scale

The final grade for this course will be determined using the following schedule:

A=90-100%; B=80-89%, C=70-79%, D=60-69%, F=<60%

VI. Attendance Policy

The attendance policy will conform to IUP's undergraduate course attendance policy.

VII. Required textbooks, supplemental books and readings

Tarbuck, E.J. and Lutgens, F.K. *Earth: An Introduction to Physical Geology, 8th Edition*. Upper Saddle River, N.J.: Pearson Prentice Hall, 2005.

Tarbuck, E.J. and Lutgens, F.K. *Earth: An Introduction to Physical Geology, Student Lecture Notebook, 8th Edition*. Upper Saddle River, N.J.: Pearson Prentice Hall, 2005.

Busch, R.M. *Laboratory Manual in Physical Geology, 7th Edition*. Upper Saddle River, N.J.: Pearson Prentice Hall, 2006.

VIII. Special resource requirements

There are no special resource requirements for this course.

IX. Bibliography

In addition to the required textbooks and supplemental readings from science journals, the following will be used to develop the course curriculum:

- Press, F. and Siever, R. (2001) *Understanding Earth, 3rd ed.*: W.H. Freeman and Co., New York, 573p.
- Hamblin, W.K. and Christiansen, E.H. (2001) *Earth's Dynamic Systems, 9th ed.*: Pearson Prentice Hall, Upper Saddle River, N.J., 735p.
- Wicander, R. and Monroe, J.S. (2002) *Essentials of Geology, 3rd ed.*: Brooks Cole Publishing, Pacific Grove, CA, 523p.
- Chernicoff, S., Fox, H.A. and Tanner, L.H. (2004) *Earth: Geologic Principles and History*: Houghton Mifflin Company, New York, 570p.
- McGeary, D., Plummer, C.C. and Carlson, D.H. (2004) *Physical Geology: Earth Revealed*: McGraw Hill, Boston, 574p.
- Skinner, B.J., Porter, S.C. and Park, J. (2004) *Dynamic Earth: An Introduction to Physical Geology*: John Wiley and Sons, New York, 584p.
- Marshak, S. (2005) *Earth: Portrait of a Planet, 2nd ed.*: Norton Publishing, London, 748p.
- Smith, G.A. and Pun, A. (2006) *How Does Earth Work? Physical Geology and the Process of Science*: Pearson Prentice Hall, Upper Saddle River, N.J., 641p.

Course Analysis Questionnaire

Section A: Details of the Course

- A1. How does this course fit into the programs of the department? For which students is the course designed? Explain why his course cannot be incorporated into an existing course.**
This course is designed to replace our current GEOS 121/122 Physical Geology and Physical Geology Lab, which will be deleted as part of the larger Program Revision. This is the first course that Geoscience majors in all tracks will take as part of their program and is part of a newly designed set of three introductory courses (GEOS 201, 202, 203). The design of this course allows students to take GEOS 202 Quantitative Methods in the Geosciences concurrently with GEOS 201. Enrollment is limited to Geoscience majors and minors, Science or Science Education majors/minors, and Anthropology, Geography and Regional Planning majors, or permission of instructor.
- A2. Does this course require changes in the content of existing courses or requirements for a program?**
This course does not require changing the existing content of any other courses or requirements for any program. GEOS 121/122 will be deleted and replaced by this course.
- A3. Has this course been offered at IUP on a trial basis?**
This course has never been offered in the Geoscience Department.
- A4. Is this course to be a dual-level course?**
This course is not a dual-level course.
- A5. If this course may be taken for variable credit, what criteria will be used to relate the credits to the learning experience of each student?**
This course cannot be taken for variable credit.

- A6. Do other higher education institutions currently offer this course? If so, please list examples.**
Virtually all higher education institutions with programs in geology or earth sciences offer a course with a similar curriculum.
- A7. Is the content, or are the skills, of the proposed course recommended or required by a professional society, accrediting authority, law or other external agency?**
No professional society, accrediting authority, law or other external agency recommends or requires any specific content or skills for this course.

Section B: Interdisciplinary Implications

- B1. Will this course be taught by instructors from more than one department?**
This course will be taught by one instructor from the Geoscience Department.
- B2. What is the relationship between the content of this course and the content of courses offered by other departments?**
There is no overlap between the content of this course and that of other courses offered by other departments.
- B3. Will this course be cross-listed with other departments?**
This course will not be cross-listed with any other department.
- B4. Will seats in this course be made available to students in the School of Continuing Education?**
Seats in this course will not be available to students in Continuing Education.

Section C: Implementation

- C1. Are faculty resources adequate?**
Faculty resources are currently adequate to teach this course. This course will be counted as one preparation and six hours of equated workload.
- C2. What other resources will be needed to teach this course and how adequate are the current resources?**
- Classroom space is currently adequate to teach this course.
 - There is no special equipment required to teach either the lecture or laboratory portions of this course.
 - There may be small amounts of consumable supplies required for the laboratory portion of the class. These are either already available in the Geoscience Department or are sufficiently inexpensive that they can be covered by the department budget.
 - Library materials are currently adequate for this course.
 - There will be no additional travel expenses.
- C3. Are any of the resources for this course funded by a grant?**
No resources for this course are currently funded by a grant.
- C4. How frequently do you expect this course to be offered?**
The department expects that this course will be offered every semester (see attached program revision). There are no seasonal restrictions.

C5. How many sections of this course do you anticipate offering in any single semester?

We anticipate offering a single section of this course in a given semester.

C6. How many students do you plan to accommodate in a section of this course?

We plan to accommodate no more than twenty-four students in a section of this course. This is the maximum number of students that can be accommodated in the Geoscience Department's teaching laboratory rooms.

C7. Does any professional society recommend enrollment limits or parameters for a course of this nature?

No professional society recommends enrollment limits or parameters for this course.

C8. Not applicable.

Section D: Miscellaneous

None.

Part III. Letters of Support or Acknowledgement

See "Letters of Support or Acknowledgement" section in the main body of the Program Revisions Proposal.