

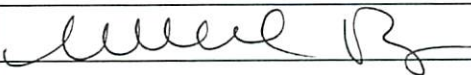
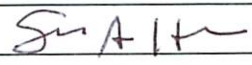
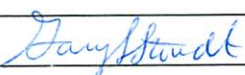


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		07-441	App-2/10/09	App 2/24/09

**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.

<b>1. Course Proposals (check all that apply)</b> <input type="checkbox"/> New Course <input type="checkbox"/> Course Prefix Change <input type="checkbox"/> Course Deletion <input type="checkbox"/> Course Revision <input type="checkbox"/> Course Number and/or Title Change <input type="checkbox"/> Catalog Description Change	
<hr/> <i>Current Course prefix, number and full title</i> <i>Proposed course prefix, number and full title, if changing</i>	
<b>2. Additional Course Designations: check if appropriate</b> <input type="checkbox"/> This course is also proposed as a Liberal Studies Course. <input type="checkbox"/> Other: (e.g., Women's Studies, Pan-African) <input type="checkbox"/> This course is also proposed as an Honors College Course.	
<b>3. Program Proposals</b> <input type="checkbox"/> New Degree Program <input type="checkbox"/> Program Title Change <input checked="" type="checkbox"/> Program Revision <input type="checkbox"/> New Minor Program <input type="checkbox"/> New Track <input type="checkbox"/> Other <input type="checkbox"/> Catalog Description Change	
<hr/> <b>Minor in Geology</b> <i>Current program name</i> <i>Proposed program name, if changing</i>	
<b>4. Approvals</b>	
Department Curriculum Committee Chair(s)	 Date: 2/4/08
Department Chair(s)	 Date: 2/4/08
College Curriculum Committee Chair	
College Dean	 Date: 2-11-08
Director of Liberal Studies *	
Director of Honors College *	
Provost *	 Date: 1/27/08
Additional signatures as appropriate: (include title)	
UWUCC Co-Chairs	 Date: 2/10/09

\* where applicable

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SEP 25 2008

FEB 14 2008

## **Geoscience Department: Program Revision for Minor in Geology**

### **Part II. Description of Curriculum Change**

#### **1. Catalog Description**

**Note:** This revised catalog description applies to the Geoscience Department's B.S. in Geology/Geology Track, B.S. in Geology/Environmental Track, B.S. in Education-Earth and Space Science, and Minor in Geology.

The catalog will be revised to read as follows:

Geology is a far-ranging science and encompasses various aspects of the Earth system. In addition to the solid Earth, this system includes the oceans and atmosphere, climate change and most aspects of our immediate environment. Professional geologists are thus engaged in a wide range of activities, depending on their interests. Scientific questions addressed by geologists include the evolution of life, the origin of volcanic activity, the assessment of volcanic and earthquake hazards, the evolution of our planetary neighbors, climate change and perhaps most importantly, the human impact on our environment.

The department offers a B.S. degree in Geology that is divided into two tracks: Geology and Environmental. Either track gives students the necessary foundation to pursue a wide variety of career goals. In addition, we offer education degrees for those students who are interested in teaching. The degrees and courses in our program emphasize hands-on learning, including outdoor instruction and student-oriented research and professional experiential learning opportunities. In addition to on-campus instruction and class-related field trips, the department also offers several regional geology Field Workshops, which take place in Newfoundland, the Northern Rockies region, Florida and the Bahamas, and the American Southwest.

Our B.S. in Geology/Geology Track is designed for students who are interested in pursuing any of the various sub-disciplines in Geology, including Oceanography/Marine Geology, Climate Change, Volcanology, Paleontology, Meteorology and Geophysics. There is also considerable overlap between geology and astronomy, as geologists study the evolution of other planetary bodies, such as the Moon, Mars and Venus; our curriculum reflects this link and provides the groundwork for planetary studies. The Geology Track thus provides students with the foundation needed to pursue a wide variety of career goals, including research (and postgraduate studies), teaching, or careers as professional geologists working with private businesses, environmental firms, or as a consultant for federal and state agencies.

The B.S. in Geology/Environmental Track is designed for students who wish to pursue careers in the rapidly expanding environmental field. While our planet has evolved over a 4.5 billion year history, our presence has had a significant impact upon our surroundings, in spite of our brief time of residence. Geologists play a key role in dealing with environmental issues, and the Environmental Track prepares students to solve environmental problems. Graduates from this track will be prepared for direct entry into jobs with federal or state agencies and private environmental consulting firms, as well as postgraduate studies.

The B.S. in Education-Earth and Space Science prepares students to become certified teachers in Pennsylvania and other states. Earth and Space Science teachers in middle and high school grades teach subjects that require a broad and solid foundation in science. Coursework includes study of geology, meteorology, oceanography, and astronomy. A basic understanding of the cognate sciences, biology, chemistry, and physics, and mathematics is also an essential part of the major. Courses in the foundations of Education and in pedagogy complement the subject matter studies. Students create and present lessons, first in Geoscience courses and then in school classrooms, culminating in the student teaching experience in the last semester.

The Minor in Geology is designed for students who desire a background in Geology, in conjunction with degrees in business or one of the social or physical sciences.

## List of courses and credits for the proposed revised program:

### Minor - Geology

<b>Required Courses:</b>		<b>1 8</b>
GEOS 201 Foundations of Geology	4cr	
GEOS 202 Quantitative Methods in the Geosciences	2cr	
12 credits from the following list:		12cr
GEOS 203 Surficial Geology		
Any 300-level GEOS course		
Any 400-level GEOS course, except GEOS 470 and 480 (1)		

(1) Only one Geoscience Field Workshop (including prerequisite Seminar) can be counted toward the minor.

## 2. Summary of Changes

### 2 (a). Comparisons of current and proposed program

#### Minor-Geology

(Current)

##### Required:

GEOS 121 Physical Geology	3cr
GEOS 122 Physical Geology Laboratory	1cr
GEOS 131 Historical Geology	3cr
GEOS 132 Historical Geology Laboratory	1cr
Three upper-level courses in Geology (300 or higher)	9cr

1 7

#### Minor-Geology

(Proposed)

##### Required Courses:

GEOS 201 Foundations of Geology	4cr	<b>1 8</b>
GEOS 202 Quantitative Methods in the Geosciences	2cr	
12 credits from the following list:		12cr
GEOS 203 Surficial Geology		
Any 300-level GEOS course		
Any 400-level GEOS course, except GEOS 470 and 480 (1)		

(1) Only one Geoscience Field Workshop (including prerequisite Seminar) can be counted toward the minor.

## 2 (b). List of Associated Course Changes

### Course Proposals Included in Program Revisions

New #	Old #	Title	Format	Revision
GEOS 111	NA	Earth Science for Educators I	NA	Deleted
GEOS 112	NA	Earth Science for Educators I Lab	NA	Deleted
GEOS 113	NA	Earth Science for Educators II	NA	Deleted
GEOS 114	NA	Earth Science for Educators II Lab	NA	Deleted
GEOS 121	NA	Physical Geology	NA	Deleted
GEOS 122	NA	Physical Geology Lab	NA	Deleted
GEOS 123	NA	Applied Mathematics in the Geosciences	NA	Deleted
GEOS 132	NA	Historical Geology Lab	NA	Deleted
GEOS 141	NA	Introduction to Ocean Science	NA	Deleted
GEOS 201	NA	Foundations of Geology	3c-3l-4cr	New course
GEOS 202	NA	Quantitative Methods in the Geosciences	2c-0l-2cr	New course
GEOS 203	NA	Surficial Processes	3c-3l-4cr	New course
GEOS 220	NA	Mineralogy	NA	Deleted
GEOS 250	150	Geology of National Parks	3c-0l-3cr	Renumbered from GEOS 150
GEOS 251	151	The Age of Dinosaurs	3c-0l-3cr	Renumbered from GEOS 151
GEOS 252	221	Physical Resources of the Earth	3c-0l-3cr	Renumbered from GEOS 221
GEOS 253	226	Forensic Geology	3c-0l-3cr	Renumbered from GEOS 226
GEOS 301	NA	Mineralogy and Petrology	3c-3l-4cr	New course
GEOS 302	325	Structural Geology	3c-3l-4cr	Renumbered from GEOS 325; increased from 3 to 4cr
GEOS 303	326	Field Geology	3c-3l-4cr	Renumbered from GEOS 326; increased from 3 to 4cr
GEOS 310	310	Environmental Geology	3c-3l-4cr	Increased from 3 to 4cr
GEOS 311	332	Geochemistry	3c-3l-4cr	Renumbered from GEOS 332; increased from 3 to 4cr
GEOS 312	331	Hydrogeology	3c-0l-3cr	Renumbered from GEOS 331; removed laboratory
GEOS 313	333	Soils and Soil Geochemistry	2c-3l-3cr	Renumbered from GEOS 333
GEOS 320	NA	Igneous and Metamorphic Petrology	NA	Deleted
GEOS 341	341	Planetary Geology	3c-3l-4cr	Renamed; increased from 3 to 4cr
GEOS 342	342	Stellar Astronomy	3c-3l-4cr	Increased from 3 to 4cr
GEOS 350	NA	Operation of the Planetarium	NA	Deleted
GEOS 351	131-132	Historical Geology	3c-3l-4cr	Renumbered from GEOS 131-132
GEOS 352	412	Sedimentation and Stratigraphy	3c-3l-4cr	Renamed from GEOS 412; increased from 3 to 4cr
GEOS 353	330	Paleontology	3c-3l-4cr	Renumbered from GEOS 330; increased from 3 to 4cr
GEOS 354	327	Geomorphology	2c-3l-3cr	Renumbered from GEOS 327
GEOS 355	411	Sedimentary Petrology	2c-3l-3cr	Renumbered from GEOS 411
GEOS 370	361	Oceanography	3c-3l-4cr	Renumbered from GEOS 361; increased from 3 to 4cr
GEOS 371	371	Meteorology	2c-3l-3cr	Renamed; description change
GEOS 401	NA	Northern Rockies Seminar	1c-0l-1cr	New course
GEOS 402	336	Northern Rockies Field Workshop	var-3cr	Renamed from GEOS 336
GEOS 403	NA	Newfoundland Seminar	1c-0l-1cr	New course
GEOS 404	337	Newfoundland Field Workshop	var-3cr	Renamed from GEOS 337
GEOS 405	NA	American Southwest Seminar	1c-0l-1cr	New course
GEOS 406	338	American Southwest Field Workshop	var-3cr	Renamed from GEOS 338
GEOS 407	NA	Carbonate Geology Seminar	1c-0l-1cr	New Course
GEOS 408	441	Carbonate Geology Field Workshop	var-3cr	Renamed from GEOS 441
GEOS 440	NA	Subsurface Geology	NA	Deleted
GEOS 470	380	Research Methods in the Geosciences	2c-0l-2cr	Renumbered from GEOS 380
GEOS 480	480	Geoscience Seminar	2c-0l-2cr	Increased from 1 to 2cr

Note: Many of the attached course proposals involve changing course numbers to conform to a more consistent numbering scheme. All 100-level courses will be introductory, liberal studies courses with associated lab sections (101-106). 200-level courses will be introductory courses for majors (201-203), as well as liberal studies courses without lab sections (250-254). 300-level courses form the core of our upper-level majors classes and are grouped according to classic subdivisions with the Geosciences (301-

371). 400-level courses include field workshops and associated seminars (401-408), our senior-level two-course research sequence (470, 480), special topics, independent study and internship courses (481-482, 493). Below are our proposed course offerings listed by “new” course numbers.

**Proposed Geoscience Course Offerings**

<b>Course</b>	<b>Title</b>	<b>Format</b>	<b>Prerequisites</b>
GEOS 101	The Dynamic Earth	3c-0l-3cr	None
GEOS 102	The Dynamic Earth Lab	0c-1l-1cr	None
GEOS 103	Oceans and Atmospheres	3c-0l-3cr	None
GEOS 104	Oceans and Atmospheres Lab	0c-1l-1cr	None
GEOS 105	Exploring the Universe	3c-0l-3cr	None
GEOS 106	Exploring the Universe Lab	0c-1l-1cr	None
GEOS 201	Foundations of Geology	3c-3l-4cr	Geoscience majors and minors, and Science or Science Education majors/minors, Anthropology, Geography and Regional Planning majors, or instructor permission
GEOS 202	Quantitative Methods in the Geosciences	2c-0l-2cr	Geoscience majors and minors only, or permission of instructor; must be taken after or concurrently with GEOS 201
GEOS 203	Surficial Processes	3c-3l-4cr	GEOS 201
GEOS 250	Geology of National Parks	3c-0l-3cr	None
GEOS 251	The Age of Dinosaurs	3c-0l-3cr	None
GEOS 252	Physical Resources of the Earth	3c-0l-3cr	None
GEOS 253	Forensic Geology	3c-0l-3cr	None
GEOS 254	Exploration of Space	3c-0l-3cr	None
GEOS 301	Mineralogy and Petrology	3c-3l-4cr	GEOS 201, 202
GEOS 302	Structural Geology	3c-3l-4cr	GEOS 201, 202
GEOS 303	Field Geology	3c-3l-4cr	GEOS 201, 202
GEOS 310	Environmental Geology	3c-3l-4cr	GEOS 202, 203
GEOS 311	Geochemistry	3c-3l-4cr	GEOS 201, 202
GEOS 312	Hydrogeology	3c-0l-3cr	GEOS 201, 202
GEOS 313	Soils and Soil Geochemistry	2c-3l-3cr	GEOS 201, 202
GEOS 341	Planetary Geology	3c-3l-4cr	MATH 121, PHYS 111
GEOS 342	Stellar Astronomy	3c-3l-4cr	MATH 121, PHYS 111
GEOS 351	Historical Geology	3c-3l-4cr	GEOS 202, 203
GEOS 352	Sedimentation and Stratigraphy	3c-3l-4cr	GEOS 202, 203
GEOS 353	Paleontology	3c-3l-4cr	GEOS 201, 202
GEOS 354	Geomorphology	2c-3l-3cr	GEOS 202, 203
GEOS 355	Sedimentary Petrology	2c-3l-3cr	GEOS 202, 203
GEOS 362	Plate Tectonics	2c-3l-3cr	PHYS 111-112; 20cr of geology
GEOS 370	Oceanography	3c-3l-4cr	GEOS 201, 202
GEOS 371	Meteorology	2c-3l-3cr	GEOS 201, 202
GEOS 401	Northern Rockies Seminar	1c-0l-1cr	GEOS 201, 202
GEOS 402	Northern Rockies Field Workshop	var-3cr	GEOS 401 and instructor permission
GEOS 403	Newfoundland Seminar	1c-0l-1cr	GEOS 201, 202
GEOS 404	Newfoundland Field Workshop	var-3cr	GEOS 403 and instructor permission
GEOS 405	American Southwest Seminar	1c-0l-1cr	GEOS 201, 202
GEOS 406	American Southwest Field Workshop	var-3cr	GEOS 405 and instructor permission
GEOS 407	Carbonate Geology Seminar	1c-0l-1cr	GEOS 201, 202
GEOS 408	Carbonate Geology Field Workshop	var-3cr	GEOS 407 and instructor permission
GEOS 470	Research Methods in the Geosciences	2c-0l-2cr	75cr or instructor permission
GEOS 480	Geoscience Seminar	2c-0l-2cr	GEOS 380, Senior standing
GEOS 481	Special Topics	var-1-3cr	As appropriate to course content
GEOS 482	Independent Study	var-1-3cr	Prior approval through advisor, faculty member
GEOS 493	Geoscience Internship	var-1-12cr	None

## **Rationale for Geoscience Department Programmatic Changes**

**Note:** This section applies to proposed program revisions for the Geoscience Department's B.S. in Geology/Geology Track, B.S. in Geology/Environmental Track, B.S. in Education-Earth and Space Science, and Minor in Geology. As such, this text will be repeated in the revision proposals for all these programs.

Never has the need for broad public understanding of our Earth and its dynamic systems been as critical as at present. Our understanding of large-scale geological processes and the volume of knowledge encompassed by the geosciences have grown exponentially over the past several decades. At the same time, our pedagogical appreciation of "how students think and learn" has driven a substantial shift in our approach to teaching science. In a series of meetings held over the past three years, the Geoscience Department outlined a number of goals (see below), which would significantly improve our programs both pedagogically and mechanically. The following outlines these goals and the ways in which the proposed program revisions will work toward achieving them.

### *Constructing a Strong Student Knowledge/Skills Base*

It is essential that students receive a complete education in the core material of their chosen discipline. Students must learn to recognize rock and mineral specimens and learn their chemical formulas, understand the history of the Earth, recognize surficial features and how geologic processes shape them, etc. We have developed a "core" set of courses for each track using existing course offerings as well as new courses that provide breadth of knowledge and skills that are critical to the training of future geoscientists and Earth science educators. Students' first steps into the programs will now occur through a series of three introductory courses that will develop the standard knowledge base and numerical and foundational skills of the discipline using creative new pedagogy of team and active learning exercises rather than the traditional "lecture/lab" approach. These courses, GEOS 201 Foundations of Geology, GEOS 202 Quantitative Methods in the Geosciences, and GEOS 203 Surficial Processes, will serve as the prerequisites for almost all of our upper-level courses.

### *Developing Collaborative and Experiential Learning*

Meaningful participatory experience can have a profound impact on student intellectual development and may be the greatest single influence to transform young science students into young scientists. Pedagogical evidence clearly supports the benefits of active learning. It enhances professional skills such as science and math competency, data analysis, communication, etc. It also develops personal attitudes, increases confidence and builds intrinsic interest in learning. In short, this style of learning gives students the cognitive capacity necessary for success and, perhaps even more importantly, develops self-knowledge and beliefs that provide students with a sense of why they learn. The combination of our students' collective experiences and abilities lead to a richer understanding of the Earth's complexity and fosters a community of learning. In our new programs, we capitalize on existing strengths we offer through interactive, hands-on learning and integrate new opportunities for paired Seminar-Field Workshop courses. We are modifying our traditional field trips into project-based field experiences unique to the particular field area (GEOS 402, 404, 406, 408). In addition we are developing a preliminary one-credit seminar for each Field Workshop to introduce students to the necessary background and skills needed to successfully complete these projects (GEOS 401, 403, 405, 407).

### *Fostering Creative Thought and Critical Analysis*

While facts are undeniably the raw materials for science, creative thought is the process by which science grows. Students must be able to use the facts to think scientifically. Hypothesis testing, falsification, and interpretation in the face of incomplete or contradictory data are critical steps in a student's intellectual growth. Our new program integrates intellectually challenging projects and real world exercises that challenge their imagination and creativity. New courses are designed to foster creative thinking and develop analytical skills, and revised existing courses expand such opportunities for our students. In addition, we are increasing research credits in GEOS 480, and expanding opportunities for project-based exercises in GEOS 201-203.



### *Modernizing Curricular Offerings*

The need to modernize our curriculum and course content arises from changes in the subfields of the geosciences over the past twenty years. A number of our course proposals involve the increase in the number of lecture hours to accommodate additional course content. These include (see above table; numbers given are “new” course numbers): GEOS 302 Structural Geology, GEOS 303 Field Geology, GEOS 310 Environmental Geology, GEOS 311 Geochemistry, GEOS 341 Planetary Geology, GEOS 353 Paleontology, and GEOS 370 Oceanography. Where appropriate, we have also combined courses into single courses reflecting a de-emphasis of particular subfields. These include GEOS 301 Mineralogy and Petrology (combines former courses GEOS 220 Mineralogy and GEOS 320 Igneous and Metamorphic Petrology) and GEOS 342 Stellar Astronomy (incorporates content from GEOS 350 Operation of the Planetarium).

### *Improving 4-year Graduation Rate*

Although specific data are not available, it is clear that very few of our Geology and Environmental Track students graduate in the four years typical of undergraduate programs. There are several reasons for this. First, it is widely acknowledged amongst undergraduate geology and geoscience departments that, of the students who eventually major in the geosciences, relatively few enter their first year of college specifically knowing that this will be their major. Rather, many if not most eventual geoscience majors “discover” the major while taking an introductory course, often as a science requirement. Second, we have a large number of students that transfer into our major either from other IUP programs, or from other universities. Third, our current curriculum has a complicated set of prerequisites which, when coupled with the fact that many of our upper-level courses are only taught every other year, creates many situations where students are unable to take a required course when it is offered and must wait up to two years for that course to be taught again. In any of these cases, our current programs provide little scheduling flexibility that would help students to graduate within the typical four-year timeframe.

We are proposing a number of program revisions to combat these issues. First, we are creating a new set of introductory courses, GEOS 201 Foundations of Geology, GEOS 202 Quantitative Methods in the Geosciences, and GEOS 203 Surficial Processes that will serve as prerequisites for almost all 300-level and 400-level courses. In addition, we plan to offer GEOS 201 and GEOS 202 (they will typically be taken concurrently) every semester which will provide maximum access to upper-level courses for students transferring into the program in either the fall or spring semester. Second, we are increasing the ability of students to select freely from upper-level Geoscience and allied science classes, increasing the number of controlled elective credits from 9-10 to 19 in the Geology Track, and from 8-9 to 20 in the Environmental Track. Third, we are allowing credit from one 100-level or 200-level course to count toward controlled electives to add increased flexibility for the student who chooses to major in Geosciences after taking one of our liberal-studies courses. Recognizing the unique nature of each student's schedule, we anticipate that students who begin either the Geology or Environmental track as late as the spring semester of their sophomore year will still be able to fulfill program requirements within the four-year timeframe.

### *Developing a Sense of Community within the Geoscience Department*

Finally, we believe that our program revisions will help to develop of a distinct community to which individuals (students, faculty, and staff) have a “sense of belonging”. Opportunities for active and small group learning are particularly important for encouraging identity with the geoscience community. Field trips and field workshops are integrated into the new program at all levels and allow close student-faculty interactions as well as invaluable practical experiences.

### **Rationale for Changes Specific to the Minor in Geology**

GEOS 121/122 Physical Geology and Lab and GEOS 131/132 Historical Geology and Lab are being replaced with GEOS 201 Foundations of Geology and GEOS 202 Quantitative Methods in the Geosciences. The rationale for this change is that we are instituting across all of our programs a change in our introductory sequence of courses for GEOS majors and minors. Specifically, GEOS 121/122 is being deleted and GEOS 131/132 is being redesigned as an upper-level class and renumbered to GEOS 351. These courses are being replaced with GEOS 201-202-203 (see above). For the minor, we will require GEOS 201 and GEOS 202 as well as twelve credits of coursework from the specified list. As

GEOS 203 is a prerequisite for many of 300-level and 400-level classes that Geology minors may take, we anticipate that many students will take this course during fulfillment of their minor. As most of our 300-level courses are being revised to 4-credits, we are increasing the total number of credits for the minor to 18, recognizing that most students will take three courses, each consisting of four credits. To broaden student exposure to many sub-disciplines of the geosciences, we are adding the stipulation in the footnote that only a single Geoscience Field workshop and associated prerequisite seminar may be counted toward the minor.

### **Part III. Implementation**

#### **1. How will the proposed revision affect students already in the existing program?**

Students currently enrolled as Geology minors will finish their program as it is currently specified with the following exception. These students, instead of having to take three upper-level courses in Geology (current requirement) for nine credits, will simply have to take nine credits of 300-level or 400-level coursework irrespective of the number of courses. The rationale for this is that many of our upper-level courses are being revised to four credits and we want to avoid the situation where students are forced to take extra credits to fulfill the minor beyond the requirements in place at the time they registered as minors. The total required credits for students currently enrolled as minors will stay at 17 credits.

#### **2. Are faculty resources adequate? If you are not requesting or have not been authorized to hire additional faculty, demonstrate how this program will fit into the schedule(s) of current faculty.**

No additional faculty resources are required.

#### **3. Are other resources adequate?**

Yes, there are no program changes that require facilities or resources not already available.

#### **4. Do you expect an increase or decrease in the number of students as a result of these revisions? If so, how will the department adjust?**

Although difficult to assess in light of the overall decline in demographics for western Pennsylvania's college matriculation, we anticipate a steady or perhaps slight increase in enrollment to major's courses over the next few years. Our new program eases non-major student transition into the program by removing scheduling pre-requisite barriers that currently penalize students who transfer into our program from our introductory sections. Even so, we can still accommodate at least a 50-75% increase in most of our major's courses without any difficulty.

### **Part IV. Periodic Assessment**

#### **1. Describe the evaluation plan. Include evaluation criteria. Specify how student input will be incorporated into the evaluation process.**

During retreats and planning sessions conducted as part of our five-year review in 2004-2005, the Geoscience Department came to the following consensus on the goals for students in our three major programs (Geology, Environmental Geology & Earth & Space Science Education). These goals are:

1. Effective oral and written communication skills:
  - a. giving a research talk (for geology/environmental majors)
  - b. teaching a lesson plan (for education majors)
2. Quantitative skills appropriate for earth science problems
3. Professional skills need for field, lab and computer tasks:
  - a. identify common rocks and minerals (all majors)
  - b. keep a detailed and accurate field notebook (geology/environmental majors)
  - c. use a Brunton Compass (geology/environmental majors)
  - d. use common analytic software programs (geology/environmental majors)
4. Knowledge of the critical content areas:
  - a. plate tectonic theory (all majors)
  - b. organic evolution (all majors)



- c. environmental issues (all majors)
- d. evolution of solar system & universe (education majors)

A consultation in February of 2005 with Dr. Barbara Walvoord helped us simplify and streamline our initial ideas to create the following student assessment plan [NOTE: All course numbers are the new proposed course numbers]:

1. Geology and environmental track students are required to take GEOS 480 Geoscience Seminar and present talks at Geoscience Day. These students will be rated on the writing of their abstract, their oral presentation, the quantitative methods used in their research and their demonstration of adequate content knowledge. A new evaluation form was designed to focus on the desired student outcomes and facilitate long-term data acquisition. Education students who are not required to take GEOS 480 Geoscience Seminar will initially be evaluated for the same set of desired skills based on their student teaching experiences as evaluated by themselves, their faculty supervisors and their cooperating teachers. The department will work to establish an evening equivalent to Geoscience Day for education students, where they can present a lesson that they taught to actual students in their classrooms for faculty rubric evaluation.
2. Quantitative skills appropriate for earth science problems will be assessed initially in GEOS 202 Quantitative Methods in the Geosciences (see attached course proposal), and again in GEOS 470 Research Methods in the Geosciences, as well as GEOS 480 Geoscience Seminar.
3. Professional skills will be directly measured and evaluated in courses as follows:
  - Rock & Mineral ID: GEOS 201 Foundations of Geology, GEOS 470 Research Methods in the Geosciences
  - Field Notebooks: GEOS 203 Surficial Processes & GEOS 303, 401-408 (Field Based Courses)
  - Brunton compass use: GEOS 201 Foundations of Geology, GEOS 470 Research Methods in the Geosciences
  - Software Skills: GEOS 202 Quantitative Methods in the Geosciences, GEOS 470 Research Methods in the Geosciences
4. Knowledge of the critical content areas will be directly assessed in required courses as follows:
  - Plate tectonic theory: GEOS 201 Foundations of Geology, GEOS 303, 401-408 (Field Based Courses)
  - Organic evolution: GEOS 201 Foundations of Geology (all majors); GEOS 353 Paleontology (Earth and Space Science Education majors)
  - Environmental issues: GEOS 203 Surficial Processes (Geology and Environmental Track); GEOS 370 Oceanography, GEOS 371 Meteorology (Earth and Space Science Education majors)
  - Evolution of solar system & universe (education majors only): GEOS 341 Planetary Geology, GEOS 342 Stellar Astronomy

## 2. Specify the frequency of the evaluations.

Assessment data will be collected annually by individual faculty members and adjusted as necessary. Collectively, department faculty will evaluate and discuss program revisions during annual daylong meetings and modify criteria and assessment strategies as needed. A full program assessment will be performed during every 5-year departmental review; our next review is currently scheduled for 2010.

## 3. Identify the evaluating entity.

We have instituted a simple set of tests for each relevant course that will tell us if our students are actually learning and using the skills they had been taught. We have designed rubrics to facilitate this process and have begun implementing annual program assessments as per our 2005 five-year Academic Program Review. In addition, we are creating a senior 'exit interview' in an online questionnaire format to find out if students' own learning goals were met by program. We will also continue administering our alumni questionnaire (give a year or two after graduation to each cohort of students) by putting it in an online format as well.

## **Part V. Course Proposals**

Attached are all required course proposals for the above changes.

## **Part VI. Letters of Support**

The Geoscience Department respects the need for other programs and departments affected by our proposed program revisions to be suitably informed of these revisions and given the opportunity to express support or lack of support for them. Although no other departments are directly affected by changes to the Minor in Geology, the following table outlines our efforts to inform departments of course and other program revisions, and give them a chance to comment on them.

### **Anthropology Department**

April 9, 2007: Dr. Poage met with Dr Neusius, Chair of the Anthropology Department to discuss impacts of proposed revisions. **Outcome**: Letter of support sent by email (attached).

### **Geography and Regional Planning Department**

September 4, 2007: Dr. Poage emailed Dr. Benhart, Chair of the Geography and Regional Planning Department, seeking a letter of support regarding potential content overlap between GEOG 342 Physiography and the proposed course GEOS 203 Surficial Processes (email attached). **Outcome**: At the time of submission, no official response has been received from the Department of Geography and Regional Planning.

### **Biology Department**

August 31, 2007: Dr. Poage sent the attached letter to the Biology Department Curriculum Committee Chair, Dr. Ayebo. **Outcome**: A meeting was arranged with the Biology Department Curriculum Committee to discuss the impacts of proposed revisions.

September 21, 2007: Dr. Poage met with the Biology Department Curriculum Committee to discuss the impacts of proposed revisions. **Outcome**: Committee members agreed that the impacts were minimal and manageable. At the time of submission, no official response has been received from the Biology Department.

### **Chemistry Department**

September 10, 2007: Dr. Poage met with Dr. Woolcock, Chair of the Chemistry Department, and Dr. Briggs, Chemistry Education Coordinator, to discuss the impacts of proposed revisions. **Outcome**: It was requested that a formal letter to the Chemistry Department should be provided outlining the impacts to the Chemistry Department. The impacts would then be reviewed by the Chemistry Department and a vote taken as to whether or not the department should support the proposed revisions.

September 11, 2007: Dr. Poage submitted the attached letter to the Chemistry Department. **Outcome**: At the time of submission, no official response has been received from the Chemistry Department.

February 11, 2008: At the request of the College of Natural Science and Mathematics' Curriculum Committee, Dr. Poage sent the attached for-information notice concerning proposed changes in controlled electives to Dr. Kondo, the Chemistry Department's representative to the Committee.

### **Physics Department**

September 10, 2007: Dr. Poage met with Dr. Talwar, Chair of the Physics Department to discuss the impacts of proposed revisions. **Outcome**: A meeting was arranged with the Physics Department to discuss the impacts of proposed revisions.

September 14, 2007: Dr. Poage met with Physics Department faculty to discuss the impacts of proposed revisions. **Outcome**: Faculty members agreed that the impacts were minimal and manageable. At the time of submission, no official response has been received from the Physics Department.

### **Computer Science Department**

February 11, 2008: At the request of the College of Natural Science and Mathematics' Curriculum Committee, Dr. Poage sent the attached for-information notice concerning proposed changes in controlled electives to Mr. Wolfe, the Computer Science Department's representative to the Committee.

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**From:** "Phillip Neusius" <phun@iup.edu>  
**Subject:** Geoscience Curriculum Proposal  
**Date:** Mon, 16 Apr 2007 10:18:13 -0400  
**To:** "Michael A Poage" <mpoage@iup.edu>  
**Cc:** "Phillip Neusius" <phun@iup.edu>

Headers  
 Decode

Mike,

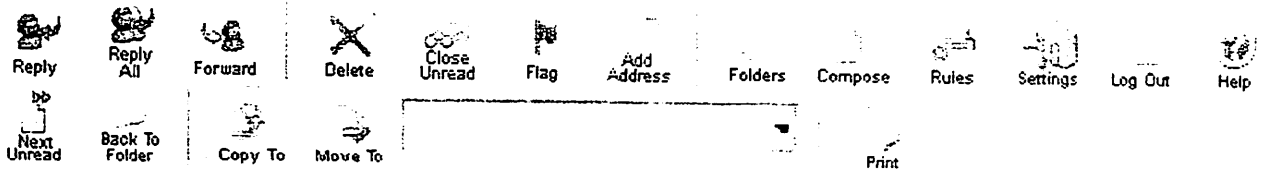
Thanks for taking the time to stop by and share the Geoscience Department's planned curriculum changes. I have shared them with our faculty. We are genuinely excited about some of the opportunities this will present for our students. Anthropology fully supports your planned changes.

Sincerely,  
 Phil Neusius, Chair  
 Anthropology Department

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From: "Michael A Poage" <mpoage@iup.edu>  
Subject: Letter of Support?  
Date: Tue, 04 Sep 2007 13:45:26 -0400  
To: jbenhart  
Cc: jclewis

Headers  
Decode

Dear John,

The Department of Geoscience is in the final stages of assembling program revisions proposals involving extensive curricular changes. Amongst these is the development of a new set of introductory courses for our majors (GEOS 201, 202, 203). GEOS 203 Surficial Processes has some content overlap with GEOG 342 Physiography and we are seeking a letter of support from the Department of Geography and Regional Planning with respect to the development of this new course.

As the two courses are targeting different student populations (upper level GEOG students vs. intro level GEOS students), I suspect there will be very little if any competition for students between them. The study of active surface processes is a growth area in the geosciences and we feel that it is in the best interest of our majors to introduce them to this important field as early as is practical.

I have attached a copy of the course proposal which you should feel free to share with your colleagues. If you have any questions or concerns, feel free to contact me either by email or at 7-5627. I would be happy to meet with you and/or your department curriculum committee if need be to discuss this new course.

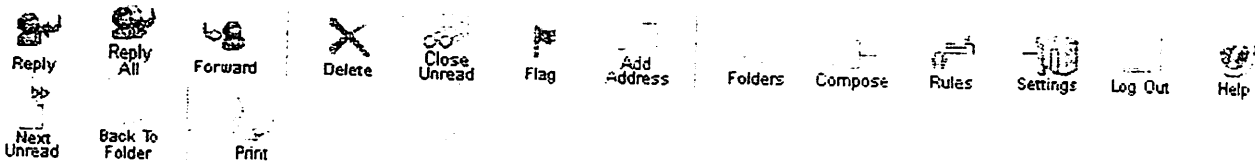
I look forward to hearing back from you soon.

Cheers,

Michael Poage  
Department of Geoscience



Attachment: 203 Surficial Processes.doc (105K)



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# Indiana University of Pennsylvania

**Michael A. Poage, Ph.D.**

Department of Geoscience  
118 Walsh Hall  
Indiana, PA 15705-1087

TELEPHONE: 724-357-5627

FAX: 724-357-5700

E-MAIL: mpoage@iup.edu

August 31, 2007

Dr. Amadu Ayebo

Chair, Department of Biology Curriculum Committee

Dear Dr. Ayebo,

The Department of Geoscience is proposing substantial curricular changes that will impact some Biology Department programs. As per the Undergraduate Catalog, the following Biology programs list GEOS course among their Ancillary Science Courses or Controlled Electives:

## Bachelor of Arts and Bachelor of Science – Biology

### **Ancillary Science Courses (4-5 credits for BA; 20-21 credits for BS):**

GEOS 121/122	Physical Geology Lecture and Lab	[3c-0l-3cr; 0c-3l-1cr]
GEOS 131/132	Historical Geology Lecture and Lab	[3c-0l-3cr; 0c-3l-1cr]
GEOS 141	Introduction to Ocean Science	[3c-0l-3cr]
GEOS 310	Environmental Geology	[2c-3l-3cr]
GEOS 330	Paleontology	[2c-3l-3cr]
GEOS 331	Hydrogeology	[2c-3l-3cr]
GEOS 361	Physical Oceanography	[2c-3l-3cr]

## Bachelor of Science – Environmental Health Science

### **Controlled Electives (six courses):**

GEOS 121/122	Physical Geology Lecture and Lab	[3c-0l-3cr; 0c-3l-1cr]
GEOS 331	Hydrogeology	[2c-3l-3cr]

### **Revisions to the Department of Geoscience Curriculum:**

With respect to the above courses, the Department of Geoscience is proposing the following changes.

GEOS 121/122	Delete; replace with GEOS 201 Foundations of Geology
GEOS 131/132	Lecture and lab will be combined into a single course GEOS 351
GEOS 141	Delete; this course has not been offered for many years
GEOS 310	Change to 3c-3l-4cr
GEOS 330	Renumber to GEOS 353; change to 3c-3l-4cr
GEOS 331	Renumber to GEOS 312; change to 3c-0l-3c
GEOS 361	Renumber to GEOS 370; change to 3c-3l-4cr

Course proposals relevant to these changes are attached.

We are seeking a letter of support from the Department of Biology with respect to these changes, recognizing that this will necessarily require course-numbering changes for the above Biology programs to be made in the Undergraduate Catalog.

If you have any questions, do not hesitate to contact me. I will be happy to meet with your department curriculum committee to discuss this matter if need be.

Sincerely,

Michael Poage  
Chair, Department of Geoscience Curriculum Committee



# Indiana University of Pennsylvania

**Michael A. Poage, Ph.D.**  
Department of Geoscience  
118 Walsh Hall  
Indiana, PA 15705-1087

TELEPHONE: 724-357-5627  
FAX: 724-357-5700  
E-MAIL: mpoage@iup.edu

September 11, 2007

Dr. John Woolcock  
Chair, Department of Chemistry

Dear Dr. Woolcock,

As we discussed in our meeting with Dr. Michael Briggs yesterday, the Department of Geoscience is proposing significant curricular and programmatic changes that will impact Bachelor of Science in Education-Chemistry program. As per the 2007-2008 Undergraduate Catalog, this program requires four credits of GEOS coursework, currently listed as either GEOS 111/112 Earth Science for Educators I (with lab) or GEOS 113/114 Earth Science for Educators II (with lab).

Accompanying the proposed termination of the General Science Education program, for which these courses were developed, we are also proposing to delete GEOS 111/112 and GEOS 113/114. These courses were last taught in the 2005-6 academic year. In each of the past five years that these courses were taught, enrollment was less than ten students.

Recognizing that the deletion of these courses will necessarily require modification of the Bachelor of Science in Education-Chemistry program, we suggest the following alternative four-credit course options:

- GEOS 201 Foundations of Geology (proposed new course)
- GEOS 101/102 The Dynamic Earth (lecture and lab)
- GEOS 103/104 Oceans and Atmospheres (lecture and lab)
- GEOS 106/106 Exploring the Universe (lecture and lab)

To assist in the evaluation of these options, I have included the new course proposal for GEOS 201, as well as current syllabi for GEOS 101/102, GEOS 103/104, and GEOS 105/106.

Ultimately we are seeking a letter of support from the Department of Chemistry with respect to the deletion of GEOS 111/112 and GEOS 113/114, to be included in our larger program revisions proposal. We hope to submit this proposal in mid-late October.

If you have any questions, do not hesitate to contact me. I will be happy to meet with your department curriculum committee to discuss this matter if need be.

Sincerely,

Michael Poage  
Chair, Department of Geoscience Curriculum Committee

# Indiana University of Pennsylvania

Department of Chemistry  
Weyandt Hall, Room 143  
975 Oakland Avenue  
Indiana, Pennsylvania 15705-1076

724-357-2361  
Fax: 724-357-2437  
Internet: <http://www.iup.edu>

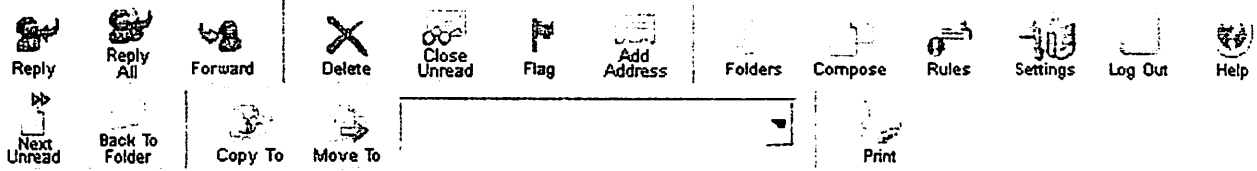
To: Dr. Michael Poage

From: John Woolcock, Chair, IUP Chemistry Department

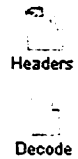
Subject: Deletion of GEOS 111/112 and GEOS 113/114

The Chemistry Department Curriculum Committee and the Chemistry Faculty voted on 11/27/07 to support the deletion of GEOS 111/112 and GEOS 113/114 with the understanding that GEOS 201 would be used to satisfy the geoscience course requirement by CHED majors in our Department instead of GEOS 111/112 or GEOS 113/114. Also we would like the Chairs of the Chemistry and Geoscience Departments to agree to work out a scheduling of the course so that there are no time conflicts with this and other CHEM courses that CHED students take during the same semester including CHEM 3321, 341 and CHEM 343.

**IUP I-Mail: Message from Sent Items Folder**



**From:** "Michael A Poage" <mpoage@iup.edu>  
**Subject:** Geoscience Controlled Elective Changes  
**Date:** Mon, 11 Feb 2008 09:12:09 -0500  
**To:** akondo  
**Cc:** woolcock, hovan

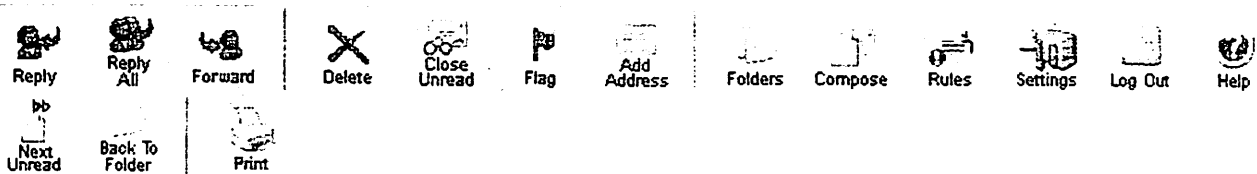


Dear Dr. Kondo,

At the request of the College of Natural Science and Mathematics' Curriculum Committee, I am writing to inform the Chemistry Department of proposed changes to the controlled electives of the Geoscience Department's B.S.-Geology/Geology Track. As discussed in the College Curriculum Committee's December meeting, the Geoscience department is proposing to include CHEM 231, 232, 322, 323, and 341 as controlled electives in this program, where previously there were no Chemistry controlled electives.

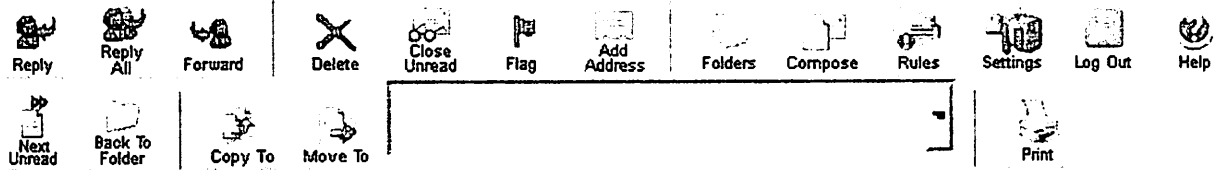
Sincerely,

Michael Poage  
 Chair, Geoscience Department Curriculum Committee

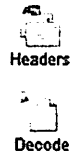


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 Last updated: 03/13/2004 by jbr

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From: "Michael A Poage" <mpoage@iup.edu>  
Subject: Prerequisite change  
Date: Mon, 21 Jul 2008 12:37:39 -0400  
To: Anne.kondo@iup.edu  
Cc: john.woolcock@iup.edu, hovan@iup.edu



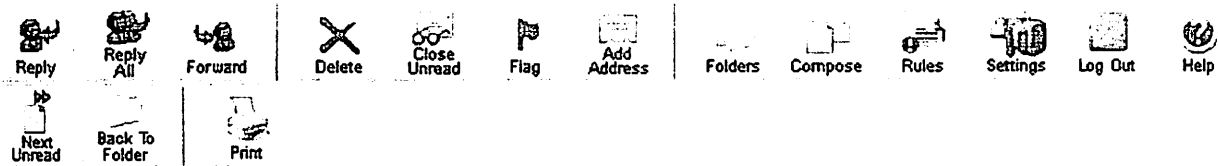
Dear Dr. Kondo,

At the request of the Screening Committee of the University Wide Undergraduate Curriculum Committee, I am writing to inform you of a pending prerequisite change to GEOS 332 Geochemistry. The current prerequisites include CHEM 111-112. As part of the Geoscience Department's curriculum restructuring, we are proposing to change this prerequisite to CHEM 111 only.

If you have questions regarding this change, please do not hesitate to contact me.

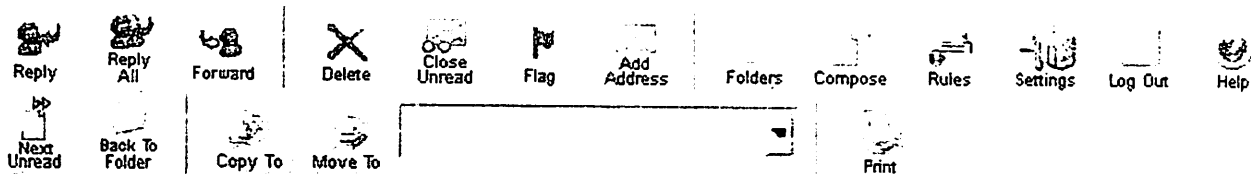
Sincerely,

Michael Poage  
Geoscience Department



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**From:** "Michael A Poage" <mpoage@iup.edu>  
**Subject:** Geoscience Controlled Elective Changes  
**Date:** Mon, 11 Feb 2008 09:13:39 -0500  
**To:** jlwolfe  
**Cc:** oblitey, hovan

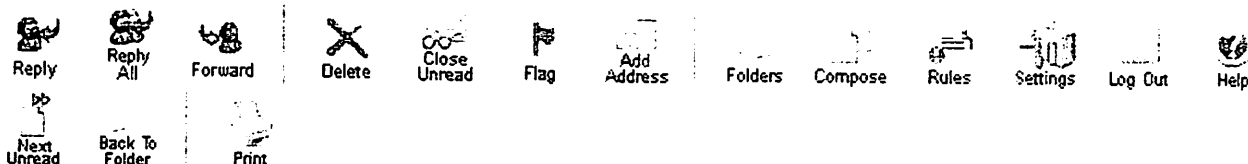
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Dear Mr. Wolfe,

At the request of the College of Natural Science and Mathematics' Curriculum Committee, I am writing to inform the Computer Science Department of proposed changes to the controlled electives of the Geoscience Department's B.S.-Geology/Geology Track and B.S.-Geology/Environmental Track. As discussed in the College Curriculum Committee's December meeting, the Geoscience department is proposing to include COSC 250, 310, and 362 as controlled electives in these programs, where previously only COSC 250 was listed as a controlled elective for our B.S.-Geology/Environmental Track.

Sincerely,

Michael Poage  
 Chair, Geoscience Department Curriculum Committee



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