

LSC Use Only  
Number: \_\_\_\_\_  
Action: \_\_\_\_\_  
Date: \_\_\_\_\_

UWUCC Use Only  
Number: 93-8  
Action: App 12/14/93  
Date: Sen App 3/1/94

**CURRICULUM PROPOSAL COVER SHEET**  
**University-Wide Undergraduate Curriculum Committee**

**I. Title/Author of Change**

Course/Program Title: Revised B.S. in ~~Geology~~ *Environmental Geoscience*  
~~Suggested 20-Character Course Title:~~ \_\_\_\_\_  
Department: Geoscience  
Contact Person: Dr. Karen Rose Cerpone

**II. If a course, is it being Proposed for:**

Course Revision/Approval Only  
 Course Revision/Approval and Liberal Studies Approval  
 Liberal Studies Approval Only (course previously has been approved by the University Senate)

**III. Approvals**

*Darlene Richardson*  
Department Curriculum Committee

*JW Hall*  
Department Chairperson

*Hamist*  
College Curriculum Committee

*W.J. Cole*  
College Dean \*

\_\_\_\_\_  
Director of Liberal Studies  
(where applicable)

\_\_\_\_\_  
Provost (where applicable)

\*College Dean must consult with Provost before approving curriculum changes. Approval by College Dean indicates that the proposed change is consistent with long range planning documents, that all requests for resources made as part of the proposal can be met, and that the proposal has the support of the university administration.

**IV. Timetable**

Date Submitted  
to LSC: \_\_\_\_\_  
to UWUCC: 5/93

Semester to be  
implemented:  
Fall 1994

Date to be  
published  
in Catalog:  
1993

**Part IV. Description of Curriculum change****1. Catalog description (underlines indicate additions/revisions)****Bachelor of Science – Environmental Geoscience****Liberal Studies:**

56-57

Math: MA 123Natural Science: CH 111/112 or 113/114LS Electives: MA 124, no course with GS prefix**Major:****Required courses:**

27

GS 121 Physical Geology 3sh

GS 123 Intensive Physical Geology Lab 1sh

GS 131 Historical Geology 3sh

GS 133 Intensive Historical Geology Lab 1sh

GS 310 Environmental Geology 3sh

GS 321 Mineralogy 3shGS 322 Igneous and Metamorphic Petrology 3sh

GS 325 Structural Geology 3sh

GS 331 Hydrogeology 3sh

GS 332 Geochemistry 3sh

GS 480 Seminar 1sh

**Other requirements:**

15

BI 105 Cell Biology 4sh

BI 361 Microbiology 3sh

CH 231 Organic Chemistry 4sh

CH 323 Analytical Methods 4sh

**Controlled electives (from list)**

8-9

BI 272 Conserv. Plant/Animal Resources	3sh	GE 314 Map and Photo Interp.	3sh
<u>BI 321 Environmental Protection I</u>	<u>3sh</u>	GE 415 Remote Sensing	3sh
BI 362 Ecology	3sh	GS 326 Field Geology	3sh
<u>CH 341 Physical Chemistry I</u>	<u>4sh</u>	<u>GS 327 Geomorphology</u>	<u>3sh</u>
<u>CH 322 Instrumental Analysis</u>	<u>4sh</u>	<u>GS 411 Sedimentary Petrology</u>	<u>3sh</u>
CO 110 Problem Solv. & Structured Analysis	3sh	GS 432 Coal Geology	3sh
CO 220 Applied Computer Programming	3sh	GS 440 Subsurface Geology	3sh
CO 250 Introduction to Numeric Methods	3sh	PY 111/121 Physics I	4sh (1)
CO 310 Data Structures	3sh	PY 112/122 Physics II	4sh (1)

**Foreign Language Intermediate Level OR Two of the following:**

0-6(2)

CO 220, CO 250, CO 310, other higher-level CO courseswith departmental permission in consultation with the  
Computer Science Department.**Free electives**

10-18

**Total degree requirements**

124

- (1) Students who plan to pursue an advanced degree in Environmental Geoscience are strongly advised to take the physics sequence as their controlled electives.
- (2) Intermediate-level foreign language may be included in liberal studies electives.

## 2. Justification for changes

### **Change from MA 121/122 (Calculus for Business, Natural and Social Science) to 123/124 (Calculus for Physics and Chemistry)**

The recent shift of geological research from primarily field-based study to lab-based analysis and computer modeling obliges our students to take more rigorous courses in math. Furthermore, the recent addition of computer-aided science applications in the MA 123/124 sequence (including projects developed specifically for geology) will make this class more effective and useful for our students than MA 121/122. See attached letter of support from the Math Department.

### **Optional replacement of CH 111/112 (General Chemistry) with CH 113/114 (Concepts in Chemistry & Basic Inorganic Chemistry)**

The branch of geology known as geochemistry is becoming increasingly important in environmental clean-ups and global climate modeling. We therefore wish to encourage our geochemically-inclined students to take a more rigorous level of chemistry, to prepare them for the upper-level chemistry courses they may later take at IUP or in graduate school. Other students, who do not plan to enter this branch of geology, will continue to take the CH 111/112 sequence. See attached letter of support from the Chemistry Department.

### **Addition of GS 321 (Mineralogy) and GS 322 (Igneous & Metamorphic Petrology) to the required course list**

Soon after the initiation of our new Environmental geology degree program, we found that students from this program who wanted to enter graduate school were having severe difficulties with the GRE Advanced Exam in Geology, which is required by most schools offering graduate work in environmental geoscience. After talking with the students, we traced this problem to the lack of intermediate-level courses dealing with the genesis and identification of rocks and minerals. Upon consideration, the department realized that this same deficiency could also limit our students' ability to follow a variety of career paths in the environmental geoscience field. To remedy this unforeseen problem, we wish to add the intermediate-level courses Mineralogy and Petrology (already required for the BS in Geology) to the core requirements for Environmental Geoscience. To compensate for this addition, we have removed BI 110/120 (Plant/Animal Biology) and BI 321 (Environmental Protection I) from the required biology sequence. A letter of support has been requested for this change from the Biology Department (see attached memo), but has not yet been received. At the College Curriculum Committee meeting (April 22, 1993), the representative from Biology said there were no problems with these changes.

### **Optional replacement of foreign language sequence by computer language sequence**


The College of Natural Sciences & Math now allows individual departments to take responsibility for maintaining or modifying the traditional Foreign Language requirement in our college. In Geology, some fields of study (such as paleontology, archeological geology, mineralogy and petrology) still require students to read journals in other languages, while others (such as environmental geology, geochemistry, geophysics and hydrology) have a much greater need for students who can read and use computer programming languages. We therefore propose to modify the foreign language requirement so that students may either take Foreign Language to an intermediate level or take two rigorous upper-level courses in computer programming (chosen from CO 220, CO 250, CO 310 or higher-level courses). See attached letter of support from the Computer Science Department.

The current specification of intermediate-level language classes requires most of our students to take two semesters of introductory courses first. Of the 3-4 required semesters of language, only two count toward the students' Liberal Studies Electives. The rest come out of free electives. Similarly, the new optional specification of upper-level computer courses will generally require students to take introductory computer courses first.

## Summary of Changes

Old Program	New Program
1. Math sequence: MA 121/122	Math sequence: MA 123/124
2. Chem sequence: CH 111/112	Chem sequence: CH 111/12 or 113/114
3. 21 sh of core geology courses	27 sh of core geology courses: Courses added: GS 321 Mineralogy GS 322 Igneous & Metamorphic Petrology
4. 23 sh of bio/chem courses	15 sh of bio/chem courses. Courses dropped: BI 321 Environmental Protection I* (*moved to controlled elective list) BI 110/120 Plant/Animal Biology
5. Courses omitted from elective list BI 110 Plant Biology BI 120 Animal Biology BI 322 Environmental Protection II CH 232 Organic Chemistry II CH 340 Physical Chemistry for Biological Sciences GS 321 Mineralogy	Courses added to elective list BI 321 Environmental Protection I CH 341 Physical Chemistry I GS 327 Geomorphology GS 411 Sedimentary Petrology
6. Intermediate Foreign Language	Intermediate foreign language OR Two upper-level computer courses (CO 220, CO 250, CO 310, other higher-level CO courses with departmental permission in consultation with the Computer Science department)
6. 8-16 hours of free electives	10-18 hours of free electives



Date: Nov 30, 1992  
Subject: Revised Programs in Geoscience  
To: Gary Buterbaugh, Chair of Computer Science  
From: Karen Rose Cercone 

The Geoscience Department plans to revise the Foreign Language requirements in both our B.S. in Geology and B.S. in Environmental Geoscience programs. We would like to give our students the option to take two upper-level courses in Computer Science (CO 220, CO 250, CO 310 or other courses with department permission) in place of their foreign language requirement (see attachments). We anticipate that approximately 4-8 students per year will choose this alternate course sequence. Is this change agreeable to the Computer Science Department? If so, I would greatly appreciate you writing a short memo to that effect for the curriculum approval process. If you have any questions or suggestions about the proposed change, please feel free to contact me at x5623.

MEMO

To: Karen Rose Cercone

From: Pothan Varughese, Chair of Chemistry



Date: December 5, 1992

Subject: Revised Programs in Geoscience

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Our curriculum committee has examined the revised Geoscience curriculum with regard to the chemistry requirement and we are in agreement with the proposed changes suggested by you. I hope this will speed up the process of obtaining approval from the Senate and the implementation of this change.

April 22, 1993

Memorandum

To: University Senate Curriculum Committee  
College of Natural Science and Mathematics  
Curriculum Committee

From: Computer Science Departmental Curriculum Committee

Re: Letter of Support for Revised B.S. in Geology

With regard to the proposed Revised B.S. in Geology, in particular the Optional Replacement of Foreign Language Sequence by a Computer Language Sequence, the curriculum committee of the computer science department (CSCC) supports providing students with the opportunity to further their computing skills.

The CSCC sees the proposal as an alternative to foreign language and not as being equivalent to foreign language.

The core of most of our courses is problem solving using computer technology. Most of the courses teach computer language concepts and practical use of these languages to communicate algorithms to the computer system.

We think such communication, logic and problem solving skills are essential as the world becomes computerized and we journey further into the information age.



Department of Mathematics  
Indiana University of Pennsylvania  
233 Stright Hall  
Indiana, Pennsylvania 15705-1072

(412) 357-2608



To: Dr. Karen Cercone  
Geoscience Department

From: Gerald Buriok, Chairman  
Mathematics Department

*GMB*

Date: December 1, 1992

Subject: Revised Programs in Geoscience

I have read the draft of the Geoscience Department's proposed curriculum changes, and want to inform you that the Mathematics Department fully supports your proposed change in the mathematics requirement for your Geology and Environmental Geoscience programs.

As you know, there have been ongoing discussions within the College of Natural Sciences and Mathematics with regard to changing the instructional delivery system for the sequence MA 123 and 124, Calculus I and II for Chemistry and Physics. The ILI grant proposal has been submitted and if it is successful, the change will be implemented in the fall of 1993. If the grant is not awarded, we will purchase Mathematica for the Classroom of the Future and begin integrating that software into MA 123-124 as soon as possible. Either way, we anticipate meeting your expectation of the inclusion of computer-aided science applications for this sequence of courses.

Your cover memo indicated that somewhere between four and eight students per year would be taking the MA 123-124 sequence instead of the MA 121-122 sequence. I want to assure you this number of students will not impact the number of sections of these calculus sequences we offer per year, and that they can be accommodated without the requirement of additional resources on our part.

If I can be of further assistance, please contact me.



September 22, 1993

To: University-wide Undergraduate Curriculum Committee

From: Frank Hall, Chair, Geoscience Department *FH Hall*

Subject: Revised B.S. in Environmental Geoscience

The Biology Department is in the process of revising its undergraduate programs (it will probably be at the college curriculum committee in October). The curriculum changes affect our revised program in Environmental Geoscience in two ways, both of which are minor. BI 105 Cell Biology will become a non-lab course and its credits will change from 4 to 3. BI 361 Microbiology will change in number only (no content change) to BI 250. Inasmuch as our revised program will be approved with the "old" credits and number of these two Biology courses, we request that the UWUCC permit us to add a footnote to the passage of our program to permit the later substitution of 3 credits for 4 for BI 105 and to change the number from BI 361 to BI 250. The one "extra" credit in the change will allow the Environmental Geoscience program to increase free electives to 11-19.

Thus, when the UWUCC and Senate approve these minor changes in these biology courses, the Geoscience Department need not file another revision in program. If this accommodation could be made, then keeping the catalog information accurate should be easier.

Date: May 7, 1993

To: Dr. Hilda Richards  
Provost

From: William G. Cale J.E.C. AK  
Dean, NS&M

Subject: Curriculum Proposals

Attached please find several curriculum proposals submitted by departments in the College of Natural Sciences and Mathematics. Program changes for the BS in Education/Biology, BS in Geology, BS in Environmental Geoscience, BA in Psychology, and BA in Psychology/Applied Track, will not require an increase in the number of credits required or faculty workload hours.

Similarly, the proposed new courses do not necessitate additional resources. Those courses, BI 450/550 Pymatuning: Field Studies, MA 320 Mathematics for Early Childhood, PC 315 Experimental Developmental Psychology, PC 335 Experimental Social Psychology, PC 345 Human Cognition, PC 355 Animal Behavior, PC 356 Biopsychology, PC 390 Industrial- Organizational Psychology, PC 425 Experimental Organizational Psychology, are proposed in place of courses earlier deleted, courses previously offered as Special Topics, or as an alternative choice between laboratory or lecture versions of existing offerings. There will be no increase in the number of credits required and present faculty are well qualified to teach the proposed courses.