April 14, 2011

MEMORANDUM

TO: Steve Halperin  
   Dean, College of Computer, Mathematical and Natural Sciences

FROM: Elizabeth Beise  
       Associate Provost for Academic Planning and Programs

SUBJECT: Proposal to Modify the B.S. in Geology (Professional Track) (PCC log no.10035).

On March 29, 2011, the Senate PCC committee approved your proposal to modify the curriculum of the B.S. in Geology (Professional Track). A copy of the approved proposal is attached.

The change is effective Fall 2011. The College should ensure that the change is fully described in the Undergraduate Catalog and in all relevant descriptive materials, and that all advisors are informed.

MDC/

Enclosure

cc: David Salness, Chair, Senate PCC Committee  
    Sarah Bauder, Office of Student Financial Aid  
    Reka Montfort, University Senate  
    Erin Howard, Office of Information Technology  
    Donna Williams, Institutional Research & Planning  
    Anne Turkos, University Archives  
    Linda Yokoi, Office of the Registrar  
    James Dietz, Undergraduate Studies  
    Paul Smith, College of Computer, Mathematical and Natural Sciences  
    Michael Brown, Geology
This is a proposal for an alteration of the supporting course requirements for the major in Geology, Professional Track. See attached.

JUSTIFICATION/REASONS/RESOURCES (Briefly explain the reason for the proposed action. Identify the source of new resources that may be required. Details should be provided in an attachment.)

This proposal involves two changes:

• The Geology Professional Track major currently requires PHYS 141 (Principles of Physics) as a supporting requirement and allows PHYS 142 (Principles of Physics) as an elective. To facilitate the acquisition of fundamental supporting instruction in Physics by Geology majors, we propose to allow a choice between PHYS 141 and PHYS 161/174 (General Physics: Mechanics and Particle Dynamics and lab) series for the supporting requirement and elective.

• The Geology Professional Track major currently requires a 300-400 level geology elective. This proposal addresses an ambiguity in the required credit level of this elective. This change requires no additional resources. See attached.

APPROVAL SIGNATURES

1. Department Committee Chair

2. Department Chair

3. College/School PCC Chair

4. Dean

5. Dean of the Graduate School (if required)

6. Chair, Senate PCC

7. Chair of Senate

8. Vice President for Academic Affairs & Provost
1. This is a proposal to alter requirements for an existing major.

2. The Catalog Description is unchanged. The proposed program follows. Change is in boldface.

Courses currently required for the major are:

• Geology Courses
  One of the following:
  GEOL 100/110—Physical Geology and Laboratory
  GEOL 120/110—Environmental Geology and Lab
  GEOL 102—Historical Geology
  GEOL 322—Mineralogy
  GEOL 340—Geomorphology
  GEOL 341—Structural Geology
  GEOL 342—Stratigraphy and Sedimentation
  GEOL 393—Technical Writing
  GEOL 394—Research Problems
  One of the following:
  GEOL 444—Low-Temperature Geochemistry
  GEOL 445—High-Temperature Geochemistry
  GEOL 446—Introduction to Geophysics
  GEOL 451—Groundwater
  GEOL 423—Optical Mineralogy
  GEOL 443—Petrology
  GEOL 490—Field Camp

• Supporting Courses
  One of the following
  CHEM 131—Fundamentals of General Chemistry and CHEM 132—Fundamentals of General Chemistry Laboratory (4)
  CHEM 135—Chemistry for Engineers and CHEM 136—Chemistry for Engineers Laboratory (4)
  MATH 140—Calculus I
  MATH 141—Calculus II
  PHYS 141—General Physics
  One of the following
  PHYS 142—General Physics
  BIOM 301—Introduction to Biometrics
  Any of GEOL444, 445, 446 or 472 not already completed to meet the requirements above or any other 300 or 400 level Geology course not listed above.

Courses to be required for the major under the proposed revision are:

• Geology Courses
  One of the following:
  GEOL 100/110—Physical Geology and Laboratory
  GEOL 120/110—Environmental Geology and Lab
  GEOL 102—Historical Geology
GEOL 322—Mineralogy
GEOL 340—Geomorphology
GEOL 341—Structural Geology
GEOL 342—Stratigraphy and Sedimentation
GEOL 393—Technical Writing
GEOL 394—Research Problems
One of the following:
   GEOL 444—Low-Temperature Geochemistry
   GEOL 445—High-Temperature Geochemistry
GEOL 446—Introduction to Geophysics
GEOL 451—Groundwater
GEOL 423—Optical Mineralogy
GEOL 443—Petrology
GEOL 490—Field Camp

• Supporting Courses
   One of the following
   CHEM 131—Fundamentals of General Chemistry and CHEM 132— Fundamentals of General Chemistry Laboratory (4)
   CHEM 135—Chemistry for Engineers and CHEM 136— Chemistry for Engineers Laboratory (4)
MATH 140—Calculus I
MATH 141—Calculus II
   One of the following
   PHYS 141—Principles of Physics
   PHYS 161—General Physics: Mechanics and Particle Dynamics and PHYS 174—Physics Laboratory Introduction
   PHYS 171—Introductory Physics: Mechanics and Relativity and PHYS 174—Physics Laboratory Introduction
   One of the following
   PHYS 142— Principles of Physics
   PHYS 260 General Physics: Vibration, Waves, Heat, Electricity and Magnetism and PHYS 261 General Physics: Vibrations, Waves, Heat, Electricity and Magnetism (Laboratory)
   PHYS 272 Introductory Physics: Fields
   BIOM 301—Introduction to Biometrics
   Any of GEOL444, 445, 446 or 472 not already completed to meet the requirements above or any other 3-4 credit 300 or 400 level Geology course not listed above.

The proposed change in addresses two minor infelicities in the Geology program:

1) Physics supporting requirements: Historically, Geology majors have taken PHYS 141 – Principles of Physics (4 cr) to satisfy a physics supporting requirement. This course was originally chosen because it was calculus-based and included a lab. Occasionally, students would enter the major having already completed PHYS 161 - General Physics: Mechanics and Particle Dynamics (3 cr.) which is also calculus based but lacks a lab. PHYS 161 is required by some other majors and is the default number used by the transfer credit center for transfers of calculus-based physics courses. In such cases, Geology has typically accepted the substitution of PHYS 161 and PHYS 174, a free-standing lab course, for PHYS 141 rather than asking students to retake introductory physics, but has done so on a case by case basis.

With the increasing prominence of geophysics in the department’s research profile in the last two years, the number of students bringing physics credits into the major has increased significantly, such that administering these substitutions has become increasingly onerous. Moreover, the judgment of the Geology faculty is that
PHYS 161 is as adequate a preparation for geology as PHYS 141, provided students also obtain lab experience. Finally, Geology is concerned that appropriate students with credit for PHYS 161 might be discouraged from a geology major by the perceived need to take PHYS 141. Moreover, a small number of students have experienced similar issues with PHYS 171, the introductory course for physics majors.

The proposed revision eliminates these concerns by replacing the PHYS 141 requirement with the option between PHYS 141, the combination of PHYS 161 and PHYS 174, or the combination of PHYS 171 and PHYS 174.

This change necessitates a change to the Geology elective options that currently include PHYS 142 – Principles of Physics. This is the second course in the 141 sequence, and has historically been the elective option for physics-oriented Geology majors. If we are to accept PHYS 161 plus PHYS 174, it would be perverse not to provide physics-oriented Geology majors with the option of continuing the 161 sequence to fulfill the elective requirement. The proposed revision therefore adds PHYS 260 - General Physics: Vibration, Waves, Heat, Electricity and Magnetism and PHYS 261 - General Physics: Vibrations, Waves, Heat, Electricity and Magnetism (Laboratory) as an elective option. Similarly, students completing PHYS171 should be allowed to continue with PHYS272 as an elective.

2) The Geology Elective: The Geology Professional Track major currently requires an elective of a 300-400 level geology course not being taken to satisfy a specific major requirement. The department’s intention has always been that this be a three or four credit course. In the past, all 300-400 credit courses carried at least three credits, however in fall of 09, GEOL 329 - Instructional Assistance Practicum a one–two credit course became available. There is no reason to think that other such upper-level courses might not be offered in the future.

To resolve any ambiguity about the department’s intentions regarding the elective requirement, the proposed revision specifies that the elective course is to be three or four credits.
To: John Merck, Director of Undergraduate Studies
Department of Geology

From: Richard Ellis, Associate Chair
Department of Physics

This email is to express support for the new Geology program, which includes a requirement for PHYS161 and PHYS174. The additional numbers of students taking these courses is small and will pose no problems. Additionally, we recommend that PHYS171 be allowed as a substitute for PHYS161.

Rick Ellis