

**Executive Committee
College of Natural and Agricultural Science**

Report to Riverside Division

To be adopted:

Proposed changes to the undergraduate major requirements in Earth Sciences.

PRESENT:

**General Geology, Geobiology, Geophysics,
and Global Climate Change Options**

Core Requirements (72-74 units)

1. Lower-division requirements (58-59 units)
 - a) GEO 001, GEO 002, GEO 003/BIOL 010
 - b) BIOL 002 or both BIOL 005A and BIOL 05LA
 - c) Either CHEM 001A and CHEM 01LA or CHEM 01HA and CHEM 1HLA, either CHEM 001B and CHEM 01LB or CHEM 01HB and CHEM 01HLB, either CHEM 001C and CHEM 01LC or CHEM 01HC and CHEM 1HLC
 - d) ~~MATH 008B~~ or MATH 009A, MATH 009B, MATH 009C
 - e) PHYS 040A, PHYS 040B, PHYS 040C
2. Upper-division requirements (19-20 units)
 - a) GEO 101, GEO 115, GEO 122
 - b) STAT 100A or STAT 155

Global Climate Change Option (59 units)

1. Lower-division requirements (20 units)
 - a) BIOL 005B, BIOL 005C
 - b) GEO 009, GEO 010 and GEO 011
2. Upper-division requirements (39 units)
 - a) GEO 118, GEO 136 or GEO 137, GEO 152 or GEO 153, GEO 157, GEO 160, GEO 169
 - b) Fourteen (14) units of related upper-division course approved by the undergraduate advisor

PROPOSED:

**General Geology, Geobiology, Geophysics,
and Global Climate Change Options**

Core Requirements (72-74 units)

1. Lower-division requirements (58-59 units)
 - a) GEO 001, GEO 002, GEO 003/BIOL 010
 - b) BIOL 002 or both BIOL 005A and BIOL 05LA
 - c) Either CHEM 001A and CHEM 01LA or CHEM 01HA and CHEM 1HLA, either CHEM 001B and CHEM 01LB or CHEM 01HB and CHEM 01HLB, either CHEM 001C and CHEM 01LC or CHEM 01HC and CHEM 1HLC
 - d) MATH 009A, MATH 009B, MATH 009C
 - e) PHYS 040A, PHYS 040B, PHYS 040C or PHYS 002A, PHYS 002B, PHYS 002C and PHYS 002LA, PHYS 002LB, PHYS 002LC
2. Upper-division requirements (19-20 units)
 - a) GEO 101, GEO 115, GEO 122
 - b) STAT 100A or STAT 155

Global Climate Change Option (59 units)

1. Lower-division requirements (20 units)
 - a) BIOL 005B, BIOL 005C
 - b) GEO 009, GEO 010 and GEO 011
2. Upper-division requirements (39 units)
 - a) GEO 118, GEO 136 or GEO 137, GEO 152 or GEO 153, GEO 157, GEO 160, GEO 169
 - b) Fourteen (14) units of related upper-division course approved by the undergraduate advisor

General Geology Option (53 units)

1. GEO 100, GEO 116, GEO 118
2. GEO 102A (8 units in one quarter), and GEO 102B (1) unit summer field camp).
3. One course from GEO 157, GEO 160, GEO 161, GEO 162, GEO 169
4. One course from GEO 124, GEO 132, GEO 136, GEO 137
5. One course from GEO 140, GEO 144, GEO 145, GEO 147.
6. GEO 151 or GEO 152/BIOL 152
7. Eight (8) additional units of related upper-division courses approved by the undergraduate advisor

Geobiology Option (53 units)

1. BIOL 005B, BIOL 005C
2. GEO 100, GEO 116, GEO 118
3. GEO 102A (8 units in one quarter) and GEO 102B (1 unit in summer field camp)
4. Three courses from GEO 151, GEO 152/BIOL 152, GEO 160, GEO 169
5. Four (4) additional units of related upper-division courses approved by the undergraduate advisor

Geophysics Option (55 units)

1. MATH 046
2. CS 10 and MATH 031
3. GEO 116, GEO 118, GEO 132, GEO 140, GEO 144, and GEO 145 or GEO 147
4. Two additional 4-unit upper-division courses in Geosciences
5. Two upper-division physical science courses approved by the undergraduate advisor

General Geology Option (53 units)

1. GEO 100, GEO 116, GEO 118
2. GEO 102A (8 units in one quarter), and GEO 102B (1) unit summer field camp).
3. One course from GEO 157, GEO 160, GEO 161, GEO 162, GEO 169
4. One course from GEO 124, GEO 132, GEO 136, GEO 137
5. One course from GEO 140, GEO 144, GEO 145, GEO 147.
6. GEO 151 or GEO 152/BIOL 152
7. Eight (8) additional units of related upper-division courses approved by the undergraduate advisor

Geobiology Option (53 units)

1. BIOL 005B, BIOL 005C
2. GEO 100, GEO 116, GEO 118
3. GEO 102A (8 units in one quarter) and GEO 102B (1 unit in summer field camp)
4. Three courses from GEO 151, GEO 152/BIOL 152, GEO 160, GEO 169
5. Four (4) additional units of related upper-division courses approved by the undergraduate advisor

Geophysics Option (55 units)

1. MATH 046
2. CS 10 and MATH 031
3. GEO 116, GEO 118, GEO 132, GEO 140, GEO 144, and GEO 145 or GEO 147
4. Two additional 4-unit upper-division courses in Geosciences
5. Two upper-division physical science courses approved by the undergraduate advisor

Justification:

This change was proposed in 2011 and been in practice via undergraduate advising since without the catalog being updated; it was updated in the Transfer Selection Criteria of this major but the Core requirements section was missed.

The secondary change to remove Math 008B was approved by the department faculty and Executive Committee in July 2016 and is now being added to this request. It was originally not included as it was past the submission deadline and was to be requested for the F17 catalog, but is now being incorporated into the 2011 change request for CEP approval.

Original justification:

- The catalog descriptions indicate that PHYS 002, “General Physics,” is for biological sciences students and PHYS 040, also “General Physics,” is designed for engineering and physical sciences students. The geology major includes geophysical and geobiological options. Our core physics requirements should match that range.
- The two courses have comparable rigor. Credit is awarded for only one of PHYS 002 and PHYS 040. With grades of B in either series, students meet prerequisites for courses in the PHYS 041 course, intended for physics majors. The calculus prerequisites do differ. The calculus prerequisites to complete the PHYS 020 A-C series are MATH 009A and B; to complete PHYS 040A-C series MATH 009A, B and C are required. Geology majors will all complete three quarters of first-year.
- Geology majors will all complete three quarters of first-year calculus, regardless of their physics series.
- The geology major recruits students from several sources, including the biological sciences and engineering. Our core physics requirements should accommodate transfer from these majors. We must already accept PHYS 002 for students who change major after completing a life sciences core curriculum. The same option should be available to all geology majors. Current practice causes needless tensions.
- We seek greater scheduling flexibility. The current physics component of our core curriculum has caused severe scheduling difficulties when the Physics and Astronomy department cancels a section of PHYS 040 in which our students have registered. By accepting PHYS 002 or PHYS 040, we open more scheduling options to our students without placing additional stress on the ability of the Department of Physics and Astronomy to deliver its part of the CNAS curriculum. PHYS 002 brings two other scheduling advantages: the separable lab course and the possibility of completing MATH 009C and PHYS 002C concurrently.
- Most geology majors complete the General Geology track, even though their goals may favor geobiology or geophysics. We must also reckon with geology majors who change tracks before graduation. For these reasons we propose to accept PHYS 002 or PHYS 040 in the core curriculum of all options in the geology major, rather than differentiate the physics requirement by option.

Approvals:

Approved by the faculty of the Department of Environmental Sciences:	November 2, 2011
Approved by the Executive Committee College of Natural and Agricultural Sciences:	July 26, 2016
Approved by the Committee on Educational Policy:	August 3, 2016
Approved by Executive Council in lieu of the Division:	August 10, 2016