Geology Major & Minor Revisions – Approved by APC, 10/18/13

Principle:
- removal of hidden prerequisite in Geology track 2 (Environmental Earth Science) B.S. degree program: GEO 200 is a prerequisite for GEO 420; the former is not part of the current curriculum;
- changes to Geology B.S. track 1 & 2, Geology B.A., Geology Minor to reflect course changes in recent years.

Specifics for Geology B.S., both tracks, Geology B.A., Geology Minor:

1. The catalog designations for GEO 100L and GEO 200L have been updated to GEO 101 and GEO 201, respectively.
2. GEO 115 (environmental Sustainability) has been added to the group of entry-level courses in order that new majors who enter the program through GEO 115 can be accommodated. Overlap in fundamental content between GEO 100, OCE 100 and GEO 115 permits their being listed in parallel. Instructors of these courses confer regularly on matters of course content so as to ensure that essential concepts are integrated.
3. Elective courses in geochemistry have recently been overhauled. The previous courses under this elective heading either are no longer instructed (GEO 475) or are undergoing changes and refocusing (GEO 301). The trio of courses now listed, GCH 436, 437 and 438, are now being offered in a regular annual rotation. Since GCH 438 (Isotope Geochemistry) is a 3-credit course, this affects the possible total credits for the major, which goes from 74-75 cr to 73-75 cr. GEO 410 (Optical Mineralogy, 3 cr) has been re-introduced after a long hiatus
4. We have added the University Physics track (PHY 112+213) to the cognate course list as an alternative to College Physics (PHY 111+212). We want to encourage our students to pursue the calculus-based physics option, although most take the non-calculus versions. Also, some students change majors from programs for which they took the University physics pair, and we seek to eliminate confusion on this requirement.

Specifics for Geology B.S., track 2:

1. GEO 200/201 adds 4 credits to the total for the degree (56-60 cr as opposed to the previous 52-56 cr). This still makes this degree track substantially less credit-intensive than the traditional Geology B.S. (track 1; 73-75 cr).
2. The elective course in geochemistry that was originally listed (GEO 301) is no longer being instructed as a geochemistry course. The appropriate course for this component of the major is the newly approved GCH 437 (Earth Surface Geochemistry, also 4 cr).
3. The catalog designations for MET 210/210L have been updated to MET 210 and MET 211, respectively.

Specifics for the B.A. Geology:

1. The elective list has been updated, removing a course no longer offered (GEO 475) and replacing it with the current series of geochemistry offerings (GCH 436, 437, 438), as well as GEO 410. See point #3 in the B.S. track I justification for more details.

Geology B.S., track 1 (current)	**74-75 cr**
A. Core Requirements	37 cr
One of the following two courses:	
Geo 100 - Physical Geology	3
Oce 100 - Oceanography	3
Geo 100L - Physical Geology Laboratory	1
Geo 200/200L - Historical Geology & Laboratory	4
Geo 310 - Mineralogy	4
Geo 330 - Structural Geology	4
Geo 416 - Igneous and Metamorphic Petrology	4
Geo 420 - Sedimentation and Stratigraphy	4
Geo 440 - Invertebrate Paleontology	4
Geo 481 - Field Geology	6
Geo 399, 499, Gst 303 - Ind. Study or Internship	3
B. Elective Requirements	13-14 cr
Earth's Chemistry: One of the following:	
Geo 301 - Environmental Geology for Majors	4
Geo 475 - Geochemistry & Laboratory	4
Earth's Surface: One of the following:	
Geo 430 - Geomorphology	3
Geo 450 - Hydrogeology	3
Geo 417 - Sedimentary Petrology	3
Earth's Interior: One of the following:	
Geo 315 - Earth's Fury	3
Geo 340 - Geophysics	3
Geo 480 - Tectonics	3
Geo 486 - Field Techniques	3
One more geology elective	3-4
C. Cognate Requirements	24 cr
Mat 210 - Calculus I	4
Mat 220 - Calculus II	4
Che 111 - General Chemistry	4
Che 212 - General Chemistry	4
Phy 111 - College Physics I	4
Phy 212 - College Physics II	4

Geology B.S., track 1 (proposed)	**73-75 cr**
A. Core Requirements	37 cr
Select one from the following three:	
Geo 100 - Physical Geology	3
Geo 115 - Environmental Sustainability	3
Oce 100 - Oceanography	3
Geo 101 - Physical Geology Laboratory	1
Geo 200/201 - Historical Geology & Laboratory	4
Geo 310 - Mineralogy	4
Geo 330 - Structural Geology	4
Geo 416 - Igneous and Metamorphic Petrology	4
Geo 420 - Sedimentation and Stratigraphy	4
Geo 440 - Invertebrate Paleontology	4
Geo 481 - Field Geology	6
Geo 399, 499, Gst 303 - Ind. Study or Internship	3
B. Elective Requirements	12-14 cr
Earth's Chemistry: One of the following:	
Geo 410 - Optical Mineralogy	3
Gch 436 - Solid Earth Geochemistry	4
Gch 437 - Earth Surface Geochemistry	4
Gch 438 - Isotope Geochemistry	3
Earth's Surface: One of the following:	
Geo 430 - Geomorphology	3
Geo 450 - Hydrogeology	3
Geo 417 - Sedimentary Petrology	3
Earth's Interior: One of the following:	
Geo 315 - Earth's Fury	3
Geo 340 - Geophysics	3
Geo 480 - Tectonics	3
Geo 486 - Field Techniques	3
One more geology elective	3-4
C. Cognate Requirements	24 cr
Mat 210 - Calculus I	4
Mat 220 - Calculus II	4
Che 111 - General Chemistry	4
Che 212 - General Chemistry	4
One of the following:	
Phy 111 - College Physics I	4
Phy 112 - General University Physics I	4
One of the following:	
Phy 212 - College Physics II	4
Phy 213 - General University Physics II	4

Geology B.S., track 2 (current)	**52-56 cr**
A. Core Requirements	**22 cr**
Select one of the following:	
Geo 100 - Physical Geology	3
Oce 100 - Oceanography	3
Geo 100L - Physical Geology Laboratory	1
Geo 310 - Mineralogy	4
Geo 330 - Structural Geology	4
Geo 420 - Sedimentation and Stratigraphy	4
Geo 430 - Hydrogeology	3
Select one from the following three:	
Geo 399 - Independent Study	3
Geo 499 - Independent Study	3
Geo 486 - Field Techniques	3
Gst 303 - Internship	3
B. Elective Requirements	**15-19 cr**
Select one from the following:	3-4 cr
Geo 301 - Environmental Geology for Majors	
Geo 340 - Geophysics	
Geo 450 - Geomorphology	
Geo 399 - Independent Study (Geographic Information Systems)	
Geo 399 - Independent Study (research)	
Geo 499 - Independent Study (research)	
Select one from the following:	3 cr
Bio 363/Esc 363 - Great Lakes Environmental Issues	
Che 300 - Environmental Science	
Met 315 - Weather Disasters	
Met 320 - Humans and Atmospheric Change	
Phy 305 - Energy and the Environment	
Select three of the following courses under advisement, some courses have prerequisites:	9-12 cr
Bio 120 - Molecular and Cellular Foundations	
Bio 200 - Environmental and Population Biology	
Bio 320 - Introductory Ecology	
Bio 400 - Current Issues in Environmental and Population Biology	
Che 212 - General Chemistry II	
Che 230 - Introductory Organic Chemistry	
Che 331 - Organic Chemistry	
Mat 220 - Calculus II	
Met 220 - Meteorology for Science Majors II	
Met 305 - Climatology	
Met 340 - Air Pollution	
Phy 111 - College Physics I	
Zoo 405 - Limnology	
C. Cognate Requirements	**15 cr**
Che 111 - General Chemistry	4
Mat 210 - Calculus I	4
Mat 318 - Statistics for Scientists	3
Met 210 - Meteorology for Science Majors I	3
Met 210L - Introductory Meteorology Lab	1

Geology B.S., track 2 (proposed)	**56-60 cr**
A. Core Requirements	**26 cr**
Select one from the following three:	
Geo 100 - Physical Geology	3
Geo 115 - Environmental Sustainability	3
Oce 100 - Oceanography	3
Geo 101 - Physical Geology Laboratory	1
Geo 200/201 - Historical Geology & Laboratory	4
Geo 310 - Mineralogy	4
Geo 330 - Structural Geology	4
Geo 420 - Sedimentation and Stratigraphy	4
Geo 430 - Hydrogeology	3
Select one from the following three:	
Geo 399 - Independent Study	3
Geo 499 - Independent Study	3
Geo 486 - Field Techniques	3
Gst 303 - Internship	3
B. Elective Requirements	**15-19 cr**
Select one from the following:	3-4 cr
Gch 437 - Earth Surface Geochemistry	
Geo 340 - Geophysics	
Geo 450 - Geomorphology	
Geo 399 - Independent Study (Geographic Information Systems)	
Geo 399 - Independent Study (research)	
Geo 499 - Independent Study (research)	
Select one from the following:	3 cr
Bio 363/Esc 363 - Great Lakes Environmental Issues	
Che 300 - Environmental Science	
Met 315 - Weather Disasters	
Met 320 - Humans and Atmospheric Change	
Phy 305 - Energy and the Environment	
Select three of the following courses under advisement, some courses have prerequisites:	9-12 cr
Bio 120 - Molecular and Cellular Foundations	
Bio 200 - Environmental and Population Biology	
Bio 320 - Introductory Ecology	
Bio 400 - Current Issues in Environmental and Population Biology	
Che 212 - General Chemistry II	
Che 230 - Introductory Organic Chemistry	
Che 331 - Organic Chemistry	
Mat 220 - Calculus II	
Met 220 - Meteorology for Science Majors II	
Met 305 - Climatology	
Met 340 - Air Pollution	
Phy 111 - College Physics I	
Zoo 405 - Limnology	
C. Cognate Requirements	**15 cr**
Che 111 - General Chemistry	4
Mat 210 - Calculus I	4
Mat 318 - Statistics for Scientists	3
Met 210 - Meteorology for Science Majors I	3
Met 211 - Introductory Meteorology Lab	4

Geology B.A. (current)	**61-62 cr**
A. Core Requirements	34 cr
One of the following two courses:	
Geo 100 - Physical Geology	3
Oce 100 - Oceanography	3
Geo 100L - Physical Geology Laboratory	1
Geo 200/200L - Historical Geology & Laborat	4
Geo 310 - Mineralogy	4
Geo 330 - Structural Geology	4
Geo 416 - Igneous and Metamorphic Petrology	4
Geo 420 - Sedimentation and Stratigraphy	4
Geo 440 - Invertebrate Paleontology	4
Geo 481 - Field Geology	6
B. Elective Requirements	3-4 cr
One of the following four courses:	
Geo 301 - Environmental Geology for Major	4
Geo 315 - Earth's Fury	3
Geo 335 - Surface Water Hydrology	3
Geo 340 - Geophysics	3
Geo 417 - Sedimentary Petrology	3
Geo 430 - Hydrogeology	3
Geo 450 - Geomorphology	3
Geo 475 - Geochemistry & Laboratory	4
Geo 480 - Tectonics	3
Geo 486 - Field Techniques	3
C. Cognate Requirements	24 cr
Mat 210 - Calculus I	4
Mat 220 - Calculus II	4
Che 111 - General Chemistry	4
Che 212 - General Chemistry	4
Phy 111 - College Physics I	4
Phy 212 - College Physics II	4

Geology B.A. (proposed)	**61-62 cr**
A. Core Requirements	34 cr
Select one from the following three:	
Geo 100 - Physical Geology	3
Geo 115 - Environmental Sustainability	3
Oce 100 - Oceanography	3
Geo 101 - Physical Geology Laboratory	1
Geo 200/201 - Historical Geology & Laborato	4
Geo 310 - Mineralogy	4
Geo 330 - Structural Geology	4
Geo 416 - Igneous and Metamorphic Petrology	4
Geo 420 - Sedimentation and Stratigraphy	4
Geo 440 - Invertebrate Paleontology	4
Geo 481 - Field Geology	6
B. Elective Requirements	3-4 cr
One of the following four courses:	
Geo 315 - Earth's Fury	3
Geo 335 - Surface Water Hydrology	3
Geo 340 - Geophysics	3
Geo 410 - Optical Mineralogy	3
Geo 417 - Sedimentary Petrology	3
Geo 430 - Hydrogeology	3
Geo 450 - Geomorphology	3
Geo 480 - Tectonics	3
Geo 486 - Field Techniques	3
Gch 436 - Solid Earth Geochemistry	4
Gch 437 - Earth Surface Geochemistry	4
Gch 438 - Isotope Geochemistry	3
C. Cognate Requirements	24 cr
Mat 210 - Calculus I	4
Mat 220 - Calculus II	4
Che 111 - General Chemistry	4
Che 212 - General Chemistry	4
One of the following:	
Phy 111 - College Physics I	4
Phy 112 - General University Physics I	4
One of the following:	
Phy 212 - College Physics II	4
Phy 213 - General University Physics II	4

Geology Minor **20 cr**
(current)

A. Core Requirements 8 cr

Select one from the following three:

Geo 100 - Physical Geology	3
Geo 115 - Environmental Sustainability	3
Oce 100 - Oceanography	3
Geo 101 - Physical Geology Laboratory	1
Geo 200/200L - Historical Geology & Laborat	4

B. Elective Requirements 12 cr

Geology courses at or above the 300-level, under advisement of geology faculty. Courses have prerequisites.

Geology Minor **20 cr**
(proposed)

A. Core Requirements 8 cr

Select one from the following three:

Geo 100 - Physical Geology	3
Geo 115 - Environmental Sustainability	3
Oce 100 - Oceanography	3
Geo 101 - Physical Geology Laboratory	1
Geo 200/201 - Historical Geology & Laborato	4

B. Elective Requirements 12 cr

Geology courses at or above the 300-level, under advisement of geology faculty. Courses may have prerequisites.