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PROGRAM/DEGREE REQUIREMENT CHANGE (MAJOR/MINOR)

SUBMITTED BY:

Department	Geology and Geophysics	College/School	Natural Science and Mathematics
Prepared by	Sarah Fowell	Phone	907-474-7810
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See <http://www.uaf.edu/uafgov/faculty/cd> for a complete description of the rules governing curriculum & course changes.

PROGRAM IDENTIFICATION:

DEGREE PROGRAM	Geoscience
Degree Level: (i.e., Certificate, A.A., A.A.S., B.A., B.S., M.A., M.S., Ph.D.)	B.S.

A. CHANGE IN DEGREE REQUIREMENTS: (Brief statement of program/degree changes and objectives)

We have recently become aware of an unintended requirement that resulted from revision of our BS program to include four concentrations. Because the concentrations have different requirements for courses offered by other departments, some of these got rolled into the "major requirements". As a result, students must earn a C or better in these courses. This was not our intention. The requirements for the concentrations are reorganized below in order to:

1. correct and clarify minimum grade requirements
2. make it clear that O and W courses may be taken in any department, as both students and staff were confused by the current wording
3. correct some mistakes that appeared in the catalog (the paleontology concentration does not require Geos 304, and the lettering left out "b" for this concentration)
4. clarify which physics sequence students will have the prerequisites for by deleting alternatives

B. CURRENT REQUIREMENTS AS IT APPEARS IN THE CATALOG:

Geoscience
College of Natural Science and Mathematics
Department of Geology and Geophysics
907-474-7565
www.uaf.edu/geology/
B.S. Degrees; Minor
[Downloadable PDF](#)

RECEIVED
FEB 13 2013
Dean's Office
College of Natural Science & Mathematics

Minimum Requirements for Degree: 120 credits

Graduates in geoscience have broad backgrounds in the earth sciences and firm foundations in mathematics, physics and chemistry. Four options are available to allow students to pursue their own emphasis: geology, paleontology, geospatial science and geophysics. The options allow students to focus earlier in their studies but are flexible enough to allow students to pursue their own interests in the junior and senior years. All of the options are designed to prepare students for industry jobs in oil, mining and environmental consulting; jobs with agencies such as U.S. Geological Survey, NASA, Alaska Division of Geological and Geophysical Surveys; or graduate studies.

The geology option offers students a sound background in a spectrum geological disciplines with an emphasis on current field mapping techniques essential to exploration and research. The paleontology option is designed to provide students with the skills necessary to locate, excavate, interpret and curate specimens for museums, agencies or universities. The geospatial sciences option focuses on the principles, techniques and applications of remote sensing, GIS and GPS to prepare students for careers that require geospatial data analysis and visualization. The geophysics option challenges students to use physics in understanding geoscience concepts,

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emphasizing applications in seismology, volcanology and glaciology in the context of the Alaskan landscape. This option is designed to prepare students for graduate work in geophysics and environmental engineering fields or other disciplines that use geophysical tools such as ground penetrating radar or exploration seismology.
Major -- B.S. Degree

1. Complete the general university requirements. (As part of the core curriculum requirements, complete MATH F200X, and CHEM F105X.)
2. Complete the following:*

GEOS F101X--The Dynamic Earth--4 credits
GEOS F112X--The History of Earth and Life--4 credits
GEOS F309--Plate Tectonics--3 credits

3. Complete one of the following options:*

Option I -- Geology

- a. Complete the following:*

Chem 106X—General Chemistry II—4 credits
GEOS F213--Mineralogy--4 credits
GEOS F214--Petrology and Petrography--4 credits
GEOS F225--Field and Computer Methods in Geology--2 credits
GEOS F304--Geomorphology--3 credits
GEOS F314--Structural Geology--4 credits
GEOS F315W--Paleobiology and Paleontology--4 credits
GEOS F322--Stratigraphy and Sedimentation--4 credits
GEOS F351W--Field Geology**--8 credits
GEOS F430--Statistics and Data Analysis in Geology--3 credits
PHYS F103X and PHYS F104X--College Physics (8)
or PHYS F211 and PHYS F212--General Physics (8)--8 credits
STAT F200X--Elementary Probability and Statistics (3)
or STAT F300X--Statistics (3)--3 credits

- b. Complete 12 additional credits of upper-division GEOS courses or other upper-division courses approved by the undergraduate advisor, to include one O (oral intensive) course.*

Option II -- Paleontology

- a. Complete the following:*

Chem 106X—General Chemistry II—4 credits
GEOS F213--Mineralogy--4 credits
GEOS F214--Petrology and Petrography--4 credits
GEOS F225--Field and Computer Methods in Geology--2 credits
GEOS F304--Geomorphology--3 credits
GEOS F314--Structural Geology--4 credits
GEOS F322--Stratigraphy and Sedimentation--4 credits
GEOS F351W--Field Geology**--8 credits
GEOS F430--Statistics and Data Analysis in Geology--3 credits
PHYS F103X--College Physics (4)
or PHYS F211--General Physics (4)--4 credits
STAT F200X--Elementary Probability and Statistics (3)
or STAT F300X--Statistics--3 credits

- c. Complete the following:*

GEOS F315W--Paleobiology and Paleontology--4 credits
GEOS F317O--Paleontological Research and Laboratory Methods--2 credits

- d. Complete at least two of the following electives:*

GEOS F453--Palynology and Paleopalynology--4 credits
GEOG F485--Mass Extinctions, Neocatastrophism and the History of Life--3 credits
GEOS F486--Vertebrate Paleontology--3 credits
GEOS F488--Undergraduate Research--2 credits

- e. Complete the requirements for a minor in biological sciences--20 credits

Option III -- Geospatial Sciences

- a. Complete the following:*

Chem 106X—General Chemistry II—4 credits

GEOS F213--Mineralogy--4 credits
 GEOS F214--Petrology and Petrography--4 credits
 GEOS F304--Geomorphology--3 credits
 GEOS F314--Structural Geology--4 credits
 GEOS F322--Stratigraphy and Sedimentation--4 credits
 GEOS F351W--Field Geology**--8 credits
 PHYS F103X and PHYS F104X--College Physics (8)
 or PHYS F211 and PHYS F212--General Physics (8)--8 credits
 STAT F200X--Elementary Probability and Statistics (3)
 or STAT F300X--Statistics--3 credits

- b. Complete the following:*
 - GEOS/GEOG F222--Fundamentals of Geospatial Sciences--3 credits
 - GEOS F225--Field and Computer Methods in Geology--3 credits
 - GEOS F430--Statistics and Data Analysis in Geology--3 credits
- c. Complete at least two of the following remote sensing electives:*
 - GEOS F408--Photogeology--2 credits
 - GEOS F422--Geoscience Applications of Remote Sensing--3 credits
 - GEOS F488--Undergraduate Research--2 credits
 - NRM F641--Remote Sensing of Natural Resources--4 credits
- d. Complete at least two of the following GIS electives:*
 - GEOG F309--Cartography and Geovisualization--4 credits
 - GEOG F435--GIS Analysis--3 credits
 - GEOS F458--Geoscience Applications of GPS and GIS--3 credits
 - NRM F338--Introduction to GIS--3 credits
- e. Complete 9 additional credits of upper-division GEOS courses or other upper-division courses approved by the undergraduate advisor, to include one O (oral intensive) and one additional W (writing intensive) course.*

Option IV-- Geophysics

- a. Complete the following:*
 - MATH F201X and MATH F202X--Calculus II and III--8 credits
 - MATH F302--Differential Equations--3 credits
 - MATH F314--Linear Algebra--4 credits
 - PHYS F211 and PHYS F212--General Physics--8 credits
 - PHYS F213X--Elementary Modern Physics--4 credits
 - PHYS F220--Introduction to Computational Physics--4 credits
- b. Complete the following:*
 - GEOS F262--Rocks and Minerals--3 credits
 - GEOS F318--Solid Earth Geophysics--3 credits
 - GEOS F377O--Ice in the Climate System--3 credits
 - GEOS F406--Volcanology--3 credits
 - GEOS F431--Foundations of Geophysics--4 credits
 - GEOS F475W,O--Presentation Techniques in the Geosciences--2 credits
 - GEOS F488--Undergraduate Research--2 credits
- c. Complete at least three of the following science and engineering electives:*
 - ES F331--Mechanics of Materials--3 credits
 - ES F341--Fluid Mechanics--4 credits
 - GEOS F314--Structural Geology--4 credits
 - GEOS F322--Stratigraphy and Sedimentation--4 credits
 - GEOS F422--Geoscience Applications of Remote Sensing--3 credits
 - ME F441--Heat and Mass Transfer--3 credits
 - PHYS F301--Introduction to Mathematical Physics--4 credits
 - PHYS F313--Thermodynamics and Statistical Physics--4 credits
 - PHYS F341--Classical Physics I: Particle Mechanics--4 credits
- d. Complete 3 additional credits of upper-division GEOS courses or other upper-division courses as approved by the undergraduate advisor.*
- e. Complete one W (writing intensive) course approved by the undergraduate advisor*--3 credits

4. Minimum credits required--120 credits

* Students must earn a C grade (2.0) or better in each of these courses.

** GEOS F351 is offered at UAF during the summer of odd-numbered years. Students may substitute a 6-

credit field geology class at another institution. The geology and geophysics undergraduate advisor will assist students in placement in an approved field geology class.

Minor

Geology

1. Complete the following:
GEOS F101X--The Dynamic Earth--4 credits
GEOS F112X--The History of Earth and Life--4 credits
2. Complete 12 additional credits of GEOS courses as approved by the undergraduate geoscience advisor--12 credits
3. Minimum credits required--20 credits

Paleontology

1. Complete the following:
GEOS F101X--The Dynamic Earth--4 credits
GEOS F112X--The History of Earth and Life--4 credits
2. Complete three of the following:
GEOS F315W--Paleobiology and Paleontology--4 credits
GEOS F317O--Paleontological Research and Laboratory Methods--2 credits
GEOS F322--Stratigraphy and Sedimentation--4 credits
GEOS F453--Palynology and Paleopalynology--4 credits
GEOS F485--Mass Extinctions, Neocatastrophism and the History of Life--3 credits
GEOS F486--Vertebrate Paleontology--3 credits
3. Minimum credits required--16 - 20 credits

Geospatial Sciences

1. Complete the following:
GEOS F101X--The Dynamic Earth--4 credits
GEOS F112X--The History of Earth and Life--4 credits
GEOS/GEOG F222--Fundamentals of Geospatial Sciences--3 credits
GEOS F225--Field and Computer Methods in Geology--2 credits
GEOS F422--Geoscience Applications of Remote Sensing--3 credits
GEOS F458--Geoscience Applications of GPS and GIS--3 credits
2. Minimum credits required--19 credits

Geophysics

1. Complete the following:
GEOS F101X--The Dynamic Earth--4 credits
GEOS F112X--The History of Earth and Life--4 credits
GEOS F377O--Ice in the Climate System--3 credits
GEOS F406--Volcanology--3 credits
GEOS F318--Solid Earth Geophysics--3 credits
GEOS F431--Foundations of Geophysics--4 credits
2. Minimum credits required--21 credits

C. PROPOSED REQUIREMENTS AS IT WILL APPEAR IN THE CATALOG WITH THESE CHANGES: (Underline new wording ~~strike through old wording~~ and use complete catalog format)

Geoscience

College of Natural Science and Mathematics
Department of Geology and Geophysics
907-474-7565
www.uaf.edu/geology/
B.S. Degrees; Minor
Downloadable PDF

Minimum Requirements for Degree: 120 credits

Graduates in geoscience have broad backgrounds in the earth sciences and firm foundations in mathematics, physics and chemistry. Four options are available to allow students to pursue their own emphasis: geology, paleontology, geospatial science and geophysics. The options allow students to focus earlier in their studies but are flexible enough to allow students to pursue their own interests in the junior and senior years. All of the options are designed to prepare students for industry jobs in oil, mining and environmental consulting; jobs with agencies such as U.S. Geological Survey, NASA, Alaska Division of Geological and Geophysical Surveys; or graduate studies.

The geology option offers students a sound background in a spectrum geological disciplines with an emphasis on current field mapping techniques essential to exploration and research. The paleontology option is designed to provide students with the skills necessary to locate, excavate, interpret and curate specimens for museums, agencies or universities. The geospatial sciences option focuses on the principles, techniques and applications of remote sensing, GIS and GPS to prepare students for careers that require geospatial data analysis and visualization. The geophysics option challenges students to use physics in understanding geoscience concepts, emphasizing applications in seismology, volcanology and glaciology in the context of the Alaskan landscape. This option is designed to prepare students for graduate work in geophysics and environmental engineering fields or other disciplines that use geophysical tools such as ground penetrating radar or exploration seismology.

Major -- B.S. Degree

1. Complete the general university requirements. (As part of the core curriculum requirements, complete MATH F200X and CHEM F105X.) ~~and F106X~~

2. Complete the following:*

GEOS F101X--The Dynamic Earth--4 credits

GEOS F112X--The History of Earth and Life--4 credits

GEOS F309--Plate Tectonics--3 credits

3. Complete one of the following options:~~asterix deleted~~

Option I -- Geology

a. Complete the following:~~asterix deleted~~

Chem 106X--General Chemistry II--4 credits

PHYS F103X and PHYS F104X--College Physics (8) -- 8 credits

b. Complete the following major requirements:*

GEOS F213--Mineralogy--4 credits

GEOS F214--Petrology and Petrography--4 credits

GEOS F225--Field and Computer Methods in Geology--2 credits

GEOS F304--Geomorphology--3 credits

GEOS F314--Structural Geology--4 credits

GEOS F315W--Paleobiology and Paleontology--4 credits

GEOS F322--Stratigraphy and Sedimentation--4 credits

GEOS F351W--Field Geology**--8 credits

GEOS F430--Statistics and Data Analysis in Geology--3 credits

~~PHYS F103X and PHYS F104X--College Physics (8)~~

~~—or PHYS F211 and PHYS F212--General Physics (8) -- 8 credits~~

STAT F200X--Elementary Probability and Statistics (3)

or STAT F300X--Statistics (3)--3 credits

c. Complete 12 additional credits of upper-division GEOS courses or other upper-division courses approved by the undergraduate advisor*, ~~to include one O (oral intensive) course.*~~ including one O (oral intensive) course from any department.

Option II -- Paleontology

a. Complete the following:~~asterix deleted~~

Chem 106X--General Chemistry II--4 credits

PHYS F103X and PHYS F104X--College Physics (8) -- 8 credits

b. Complete the following major requirements:*

GEOS F213--Mineralogy--4 credits

GEOS F214--Petrology and Petrography--4 credits

GEOS F225--Field and Computer Methods in Geology--2 credits

~~GEOS F304--Geomorphology--3 credits~~

GEOS F314--Structural Geology--4 credits

GEOS F322--Stratigraphy and Sedimentation--4 credits
GEOS F351W--Field Geology**--8 credits
GEOS F430--Statistics and Data Analysis in Geology--3 credits
~~PHYS F103X--College Physics (4)~~
~~—or PHYS F211--General Physics (4) 4 credits~~
STAT F200X--Elementary Probability and Statistics (3)
or STAT F300X--Statistics--3 credits

b. Complete the following:*

GEOS F315W--Paleobiology and Paleontology--4 credits
GEOS F317O--Paleontological Research and Laboratory Methods--2 credits

c. Complete at least two of the following electives:*

GEOS F453--Palynology and Paleopalynology--4 credits
GEOG F485--Mass Extinctions, Neocatastrophism and the History of Life--3 credits
GEOS F486--Vertebrate Paleontology--3 credits
GEOS F488--Undergraduate Research--2 credits

d. Complete the requirements for a minor in biological sciences--20 credits

Option III -- Geospatial Sciences

a. Complete the following: ~~asterix deleted~~

Chem 106X--General Chemistry II--4 credits
PHYS F103X and PHYS F104X--College Physics (8) -- 8 credits

b. Complete the following major requirements:*

GEOS F213--Mineralogy--4 credits
GEOS F214--Petrology and Petrography--4 credits
GEOS F304--Geomorphology--3 credits
GEOS F314--Structural Geology--4 credits
GEOS F322--Stratigraphy and Sedimentation--4 credits
GEOS F351W--Field Geology**--8 credits
~~PHYS F103X and PHYS F104X--College Physics (8)~~
~~—or PHYS F211 and PHYS F212--General Physics (8) 8 credits~~
STAT F200X--Elementary Probability and Statistics (3)
or STAT F300X--Statistics--3 credits

b. Complete the following:*

GEOS/GEOG F222--Fundamentals of Geospatial Sciences--3 credits
GEOS F225--Field and Computer Methods in Geology--3 credits
GEOS F430--Statistics and Data Analysis in Geology--3 credits

c. Complete at least two of the following remote sensing electives:*

GEOS F408--Photogeology--2 credits
GEOS F422--Geoscience Applications of Remote Sensing--3 credits
GEOS F488--Undergraduate Research--2 credits
NRM F641--Remote Sensing of Natural Resources--4 credits

d. Complete at least two of the following GIS electives:*

GEOG F309--Cartography and Geovisualization--4 credits
GEOG F435--GIS Analysis--3 credits
GEOS F458--Geoscience Applications of GPS and GIS--3 credits
NRM F338--Introduction to GIS--3 credits

e. Complete 9 additional credits of upper-division GEOS courses or other upper-division courses approved by the undergraduate advisor*, ~~to include~~ including one O (oral intensive) and one additional W (writing intensive) course ~~asterix deleted~~ from any department.

Option IV-- Geophysics

a. Complete the following major requirements:*

MATH F201X and MATH F202X--Calculus II and III--8 credits
MATH F302--Differential Equations--3 credits
MATH F314--Linear Algebra--4 credits
PHYS F211 and PHYS F212--General Physics--8 credits
PHYS F213X--Elementary Modern Physics--4 credits
PHYS F220--Introduction to Computational Physics--4 credits

b. Complete the following:*

GEOS F262--Rocks and Minerals--3 credits
GEOS F318--Solid Earth Geophysics--3 credits
GEOS F370--Ice in the Climate System--3 credits
GEOS F406--Volcanology--3 credits
GEOS F431--Foundations of Geophysics--4 credits
GEOS F475W,O--Presentation Techniques in the Geosciences--2 credits
GEOS F488--Undergraduate Research--2 credits

477 (per course change) #

e. b. Complete at least three of the following science and engineering electives:*

ES F331--Mechanics of Materials--3 credits
ES F341--Fluid Mechanics--4 credits
GEOS F314--Structural Geology--4 credits
GEOS F322--Stratigraphy and Sedimentation--4 credits
GEOS F422--Geoscience Applications of Remote Sensing--3 credits
ME F441--Heat and Mass Transfer--3 credits
PHYS F301--Introduction to Mathematical Physics--4 credits
PHYS F313--Thermodynamics and Statistical Physics--4 credits
PHYS F341--Classical Physics I: Particle Mechanics--4 credits

c. Complete 3 additional credits of upper-division GEOS courses or other upper-division courses as approved by the undergraduate advisor.*

d. Complete one W (writing intensive) course approved by the undergraduate advisor* 3 credits

4. Minimum credits required--120 credits

* Students must earn a C grade (2.0) or better in each of these courses.

** GEOS F351 is offered at UAF during the summer of odd-numbered years. Students may substitute a 6-credit field geology class at another institution. The geology and geophysics undergraduate advisor will assist students in placement in an approved field geology class.

Minor

Geology

1. Complete the following:

GEOS F101X--The Dynamic Earth--4 credits
GEOS F112X--The History of Earth and Life--4 credits

2. Complete 12 additional credits of GEOS courses as approved by the undergraduate geoscience advisor--12 credits

3. Minimum credits required--20 credits

Paleontology

1. Complete the following:

GEOS F101X--The Dynamic Earth--4 credits
GEOS F112X--The History of Earth and Life--4 credits
2. Complete three of the following:
GEOS F315W--Paleobiology and Paleontology--4 credits
GEOS F317O--Paleontological Research and Laboratory Methods--2 credits
GEOS F322--Stratigraphy and Sedimentation--4 credits
GEOS F453--Palynology and Paleopalynology--4 credits
GEOS F485--Mass Extinctions, Neocatastrophism and the History of Life--3 credits
GEOS F486--Vertebrate Paleontology--3 credits

3. Minimum credits required--16 - 20 credits

Geospatial Sciences

1. Complete the following:

GEOS F101X--The Dynamic Earth--4 credits
GEOS F112X--The History of Earth and Life--4 credits
GEOS/GEOG F222--Fundamentals of Geospatial Sciences--3 credits
GEOS F225--Field and Computer Methods in Geology--2 credits
GEOS F422--Geoscience Applications of Remote Sensing--3 credits
GEOS F458--Geoscience Applications of GPS and GIS--3 credits

2. Minimum credits required--19 credits

Geophysics

1. Complete the following:

GEOS F101X--The Dynamic Earth--4 credits
GEOS F112X--The History of Earth and Life--4 credits
GEOS F370--Ice in the Climate System--3 credits
GEOS F406--Volcanology--3 credits
GEOS F318--Solid Earth Geophysics--3 credits

477 (per course change) #

GEOS F431--Foundations of Geophysics--4 credits
2. Minimum credits required--21 credits

D. ESTIMATED IMPACT

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

These changes are corrections and clarifications of our existing requirements. Therefore little impact on budget, faculty workloads, or facilities/space is expected.

E. IMPACTS ON PROGRAMS/DEPTS:

What programs/departments will be affected by this proposed action?
Include information on the Programs/Departments contacted (e.g., email, memo)

These changes correct unintended minimum grade requirements for Chem and Phys courses, clarify O and W expectations, and clear up minor errors in the catalog entry. This will minimize student and registrar confusion and eliminate unnecessary petitions.

F. IF MAJOR CHANGE - ASSESSMENT OF THE PROGRAM:

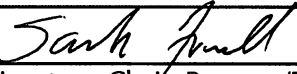
Description of the student learning outcomes assessment process.)


JUSTIFICATION FOR ACTION REQUESTED

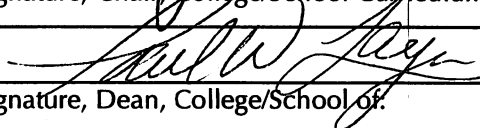
The purpose of the department and campus-wide curriculum committees is to scrutinize program/degree change applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. If you drop a course, is it because the material is covered elsewhere? Use as much space as needed to fully justify the proposed change and explain what has been done to ensure that the quality of the program is not compromised as a result.

Changes are clarification of intended requirements and correction of several errors in the current catalog entry. The intent is to make our requirements easier for students and the registrar's staff to navigate.

APPROVALS:

 Date 2/12/13
Signature, Chair, Program/Department of: Geology + Geophysics

 Date 2/13/13
Signature, Chair, College/School Curriculum Council for: CNSM

 Date 2/13/13
Signature, Dean, College/School of: CNSM

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE

 Date 
Signature, Chair, UAF Faculty Senate Curriculum Review Committee