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PROGRAM/DEGREE REQUIREMENT CHANGE (MAJOR/MINOR)

SUBMITTED BY:

Department	Geology & Geophysics	**College/School**	College of Natural Sciences and Mathematics
Prepared by	Carl Tape	**Phone**	907-474-5456
Email Contact	carltape@gi.alaska.edu pettit@gi.alaska.edu	**Faculty Contact**	Carl Tape Erin Pettit

See http://www.uaf.edu/uafgov/faculty/cd for a complete description of the rules governing curriculum & course changes.

PROGRAM IDENTIFICATION:

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

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

The catalog for 2012-2013 contained major changes to the MS and PhD program in geophysics. However, there are several typos associated with course numbers, as well as one significant error introduced into the proofs. As it stands, it looks like one additional course is required (PhD item 7: "One graduate-level advanced skills course approved by the student's advisory committee.") We correct this problem here.

B. CURRENT REQUIREMENTS AS IT APPEARS IN THE CATALOG:

Geophysics

RECEIVED
SEP 2 1 2012
Dean's Office
College of Natural Science & Mathematics

College of Natural Science and Mathematics
Department of Geology and Geophysics
907-474-7565
www.uaf.edu/geology/

M.S., Ph.D. Degrees
Minimum Requirements for Degrees: M.S.: 30 credits;
Ph.D.: 18 thesis credits

The geophysics program at UAF specializes in several broad areas of research and is closely connected with the Geophysical Institute. Although much of the research conducted by geophysics faculty takes advantage of the geographic location of the university, the faculty have research projects on all continents. Students have the option to obtain a general geophysics degree or to choose one of three concentrations to focus their studies.

Graduate Program — M.S. Degree

Concentrations: Solid-Earth Geophysics; Snow, Ice and Permafrost Geophysics; Remote Sensing Geophysics

1. Complete the following admission requirements:
a. Submit GRE scores.
b. Complete a background at least to the level of a B.S. concentration in geology, geophysics or an appropriate physical science or engineering.
c. Complete MATH F302, MATH F314, MATH F421 and PHYS F220 or equivalent.
2. Complete the general university requirements (page 202).
3. Complete the master's degree requirements (page 206).
a. Complete 6 - 12 thesis credits.
b. Complete any deficiencies concurrently with this degree.
4. Submit a written thesis proposal and pass an oral comprehensive examination centered on this proposal.
5. Complete and submit a written thesis and pass an oral defense of thesis.
6. Complete the following geophysics core requirements:
GEOS F631—Foundations of Geophysics..... 4

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GEOS F482—Geological Sciences Seminar.....1
7. Complete 6 credits from relevant graduate-level courses agreed by the advisory committee, or chose one of the following concentrations:

Solid-Earth Geophysics
a. Complete 6 credits from the following:
GEOS F604—Seismology..... 3
GEOS F605—Geochronology.....3
GEOS F607—Applied Seismology..... 3
GEOS F613—Global Tectonics.....3
GEOS F655—Tectonic Geodesy..... 3
GEOS F671—Volcano Seismology.....3
b. Minimum credits required, including thesis/research credits....30

Snow, Ice and Permafrost Geophysics
a. Complete 6 credits from the following:
GEOS F614—Ice Physics..... 3
GEOS F615—Sea Ice..... 3
GEOS F616—Permafrost..... 3
GEOS F617—Glaciers.....3
b. Minimum credits required, including thesis/research credits....30

Remote Sensing
a. Complete 6 credits from the following:
GEOS F654—Visible and Infrared Remote Sensing..... 3
GEOS F657—Microwave Remote Sensing..... 3
GEOS F622—Digital Image Processing in the Geosciences..... 3
GEOS F434/F634—Remote Sensing of the Cryosphere..... 4
GEOS F484/F684—Remote Sensing Bi-Weekly Seminar..... 1
GEOS F676—Remote Sensing of Volcanic Eruptions..... 3
GEOS F639—InSAR and its Applications.....3
ATM F413/F613—Atmospheric Radiation.....3
b. Minimum credits required,including thesis/research credits.....30

Graduate Program — Ph.D. Degree

1. Complete the following admission requirement:
a. Submit GRE scores.
2. Complete a master's degree in geology, geophysics or an appropriate field of physical science or engineering.
3. Complete the general university requirements (page 202).
4. Complete the course work requirements for the appropriate M.S. concentration.
5. Complete the geophysics core requirements:
GEOS F482—Geological Sciences Seminar..... 1
GEOS F631—Foundations of Geophysics.....4
6. Complete 3 credits each in two of the following advanced skills categories (total 6 credits):
a. Digital signal analysis and remote sensing
GEOS F654—Visible and Infrared Remote Sensing..... 3
GEOS F657—Microwave Remote Sensing..... 3
GEOS F622—Digital Image Processing in the Geosciences..... 3
PHYS F628—Digital Time Series Analysis.....3
b. Statistics and parameter estimation
ATM F693—Analysis Methods in Meteorology and Climate..... 3
GEOS F609—Inverse Problems and Parameter Estimation..... 3
STAT F401—Regression and Analysis of Variance..... 3
STAT F461—Applied Multivariate Statistics.....3
c. Numerical methods
MATH F615—Applied Numerical Analysis..... 3
MATH F661—Optimization.....3
MATH F694—Numerical Linear Algebra..... 3
ME F601—Finite Element Analysis in Engineering.....3
7. One graduate-level advanced skills course approved by the student's advisory committee
8. Complete the Ph.D. degree requirements (page 207).
9. As part of the Ph.D. degree requirements, complete the following:
a. Complete and pass a written and oral comprehensive examination.

b. Complete and submit a written thesis proposal for approval.
c. Complete a research program as arranged with the graduate advisory committee.
d. Complete 18 credits of thesis, write a thesis and pass an oral defense of thesis.
10. Minimum credits required..... 18

Admission to Ph.D. geophysics program directly from a bachelor's program:

Entering graduate students whose highest earned degree is the baccalaureate are normally admitted as master of science candidates. However, exceptionally able and accomplished students in this category are eligible for direct admission to the Ph.D. program. For direct admission from the baccalaureate to the Ph.D. program, a student must receive approval from the graduate admission committee and also meet one of three criteria:
a. At least one first-authored manuscript published, accepted, or submitted for publication in a peer-reviewed scientific journal
b. Receipt of an NSF, NIH or similar prestigious pre-doctoral fellowship.
c. Demonstrated research proficiency AND either (1) attained a GPA of at least 3.5 in mathematics and science courses at the undergraduate level, or (2) scored at or above the 80th percentile in two of three categories in the GRE. The requirement of demonstrated research proficiency can be waived for exceptionally promising students. In this case the student is required to complete a research or review paper focusing on a thesis-related topic approved by the graduate advising committee. The paper should be roughly 4,000 - 5,000 words and must be submitted and approved by the advising committee within the first three semesters to maintain Ph.D. status. Failure will result in changing the student's status to M.S. candidate.

After admission, M.S. candidates may, in exceptional cases, petition for conversion to the Ph.D. program if they satisfy one of the above criteria. Such petitions must be approved both by the student's current (M.S.) and proposed (Ph.D.) advisory committee and the department director or designee.

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)

Geophysics

College of Natural Science and Mathematics
Department of Geology and Geophysics
907-474-7565
www.uaf.edu/geology/

M.S., Ph.D. Degrees
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Graduate Program — M.S. Degree

Concentrations: Solid-Earth Geophysics; Snow, Ice and Permafrost Geophysics; Remote Sensing Geophysics

1. Complete the following admission requirements:
a. Submit GRE scores.
b. Complete a background at least to the level of a B.S. concentration in geology, geophysics or an appropriate physical science or engineering.
c. Complete MATH F302, MATH F314, MATH F421 and PHYS F220 or equivalent.
2. Complete the general university requirements (page 202).
3. Complete the master's degree requirements (page 206).
a. Complete 6 - 12 thesis credits.
b. Complete any deficiencies concurrently with this degree.
4. Submit a written thesis proposal and pass an oral comprehensive examination centered on this proposal.

5. Complete and submit a written thesis and pass an oral defense of thesis.
6. Complete the following geophysics core requirements:
GEOS F631—Foundations of Geophysics..... 4
GEOS F~~482~~682—~~Geological Sciences~~ Geoscience Seminar (fall semester).....1
7. Complete 6 credits from relevant graduate-level courses agreed by the advisory committee, or chose one of the following concentrations:

Solid-Earth Geophysics
a. Complete 6 credits from the following:
GEOS F604—Seismology..... 3
GEOS F605—Geochronology.....3
GEOS F~~607~~626—Applied Seismology..... 3
GEOS F613—Global Tectonics.....3
GEOS F655—Tectonic Geodesy..... 3
GEOS F671—Volcano Seismology.....3
b. Minimum credits required, including thesis/research credits....30

Snow, Ice and Permafrost Geophysics
a. Complete 6 credits from the following:
GEOS F614—Ice Physics..... 3
GEOS F615—Sea Ice..... 3
GEOS F616—Permafrost..... 3
GEOS F617—Glaciers.....3
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a. Complete 6 credits from the following:
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GEOS F622—Digital Image Processing in the Geosciences..... 3
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GEOS F484/F684—Remote Sensing Bi-Weekly Seminar..... 1
GEOS F676—Remote Sensing of Volcanic Eruptions..... 3
GEOS F639—InSAR and its Applications.....3
ATM F413/F613—Atmospheric Radiation.....3
b. Minimum credits required, including thesis/research credits.....30

Graduate Program — Ph.D. Degree

1. Complete the following admission requirement:
a. Submit GRE scores.
2. Complete a master's degree in geology, geophysics or an appropriate field of physical science or engineering.
3. Complete the general university requirements (page 202).
4. Complete the course work requirements for the ~~appropriate~~ M.S. (see requirements 6. and 7. above) ~~concentration~~.
~~5. Complete the geophysics core requirements:~~
~~GEOS F482—Geological Sciences Seminar..... 1~~
~~GEOS F631—Foundations of Geophysics.....4~~
~~6.~~5. Complete 3 credits each in two of the following advanced skills categories (total 6 credits):
a. Digital signal analysis and remote sensing
GEOS F654—Visible and Infrared Remote Sensing..... 3
GEOS F657—Microwave Remote Sensing..... 3
GEOS F622—Digital Image Processing in the Geosciences..... 3
PHYS F628—Digital Time Series Analysis.....3
b. Statistics and parameter estimation
ATM F693—Analysis Methods in Meteorology and Climate..... 3
GEOS F~~609~~627—Inverse Problems and Parameter Estimation..... 3
STAT F401—Regression and Analysis of Variance..... 3
STAT F461—Applied Multivariate Statistics.....3
c. Numerical methods
MATH F615—Applied Numerical Analysis..... 3
MATH F661—Optimization.....3
MATH F694—Numerical Linear Algebra..... 3
ME F601—Finite Element Analysis in Engineering.....3

~~7.~~d. One graduate-level advanced skills course approved by the student's advisory committee
~~8.~~6. Complete the Ph.D. degree requirements (page 207).
~~9.~~7. As part of the Ph.D. degree requirements, complete the following:
a. Complete and pass a written and oral comprehensive examination.
b. Complete and submit a written thesis proposal for approval.
c. Complete a research program as arranged with the graduate advisory committee.
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b. Receipt of an NSF, NIH or similar prestigious pre-doctoral fellowship.
c. Demonstrated research proficiency AND either (1) attained a GPA of at least 3.5 in mathematics and science courses at the undergraduate level, or (2) scored at or above the 80th percentile in two of three categories in the GRE. The requirement of demonstrated research proficiency can be waived for exceptionally promising students. In this case the student is required to complete a research or review paper focusing on a thesis-related topic approved by the graduate advising committee. The paper should be roughly 4,000 - 5,000 words and must be submitted and approved by the advising committee within the first three semesters to maintain Ph.D. status. Failure will result in changing the student's status to M.S. candidate.

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D. ESTIMATED IMPACT

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

The changes will not affect budget, space, or faculty workloads. But they will clarify the curriculum for the MS/PhD program.

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 will clarify the curriculum for the MS/PhD program in Geophysics, thereby affecting students and faculty in the Department of Geology and Geophysics.

F. IF MAJOR CHANGE - ASSESSMENT OF THE PROGRAM:

Description of the student learning outcomes assessment process.)

None.

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.

The catalog type-setting introduced several typos, one of which was substantial: (PhD item 7) "One graduate-level advanced skills course approved by the student's advisory committee." The 2012-2013 catalog description implies that students need one more course than we intended. These corrections are therefore important.

APPROVALS:

Signature, Chair, Program/Department of: Geology + Geophysics — Date: 7/20/12

Signature, Chair, College/School Curriculum Council for: CNSM — Date: 9/26/2012

Signature, Dean, College/School of: CNSM — Date: 9/26/12

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

Signature, Chair, UAF Faculty Senate Curriculum Review Committee — Date