Program Change Request

New Program Proposal

Date Submitted: 02/15/22 3:16 pm

Viewing: SC-PHD-GESC : Geology and Earth Sciences, PhD

Last edit: 11/11/24 2:08 pm

Changes proposed by: jbazaz

Are you completing this form on someone else's behalf?

Yes

Requestor:

In Workflow

1. **AOES Committee**
2. **AOES Chair**
3. **SC Curriculum Committee**
4. SC Associate Dean
5. Assoc Provost-Graduate
6. SACSCOC New Program Approval
7. SCHEV New Program Approval
8. Registrar: Activate Code
9. Registrar-Programs

Approval Path

1. 02/28/22 2:53 pm Barry Klinger (bklinger): Approved for AOES Committee
2. 02/28/22 3:10 pm Mark Uhen (muhen): Approved for AOES Chair
3. 03/02/22 12:26 pm Jennifer Bazaz Gettys (jbazaz): Approved for SC Curriculum Committee
4. 03/02/22 1:58 pm Jennifer Bazaz Gettys (jbazaz):

Approved for SC Associate Dean
5. 03/31/22 1:55 pm Jason McKnight (jmckni): Approved for Assoc Provost-Graduate
6. 10/30/24 3:36 pm Susan Woodruff (swoodru3): Rollback to Assoc Provost-Graduate for SACSCOC New Program Approval
7. 11/11/24 8:25 am Yellia Seanor (yseanor): Rollback to SC Curriculum Committee for Assoc Provost-Graduate

Name	Extension	Email
Mark Uhen	5264	muhen@gmu.edu

Effective Catalog:	2023-2024
Program Level:	Graduate
Program Type:	Doctoral
Degree Type:	Doctor of Philosophy
Title:	Geology and Earth Sciences, PhD
Banner Title:	PhD Geology & Earth Sciences
Is this a retitling of an existing program?	No
Registrar/OAPI Use Only – SCHEV Status	Pending Approval
Registrar's Office Use Only –	

Program Start Term

Registrar/OAPI Use Only – SCHEV Letter

Registrar/OAPI Use Only – SACSCOC Status

Concentration(s):

Registrar/IRR Use Only – Concentration CIP Code

College/School: College of Science

Department / Academic Unit: Atmospheric, Oceanic, & Earth Sciences

Jointly Owned Program? No

Justification

What: Updating the curriculum.

Why: In working with SCHEV and external reviewers, curricular adjustments were warranted.

Total Credits Required: Total credits: 72

Registrar's Office Use Only - Program Code: SC-PHD-GESC

Registrar/IRR Use Only – Program CIP Code

Admission Requirements:

Admissions

University-wide admissions policies can be found in the Graduate Admissions Policies section of this catalog. Applicants should have an undergraduate or graduate degree in geology, Earth sciences, or a related field from an institution of higher education accredited by a Mason-recognized U.S. institutional accrediting agency or international equivalent with a GPA of at least 3.00 in their undergraduate work.

To apply for this program, please complete the George Mason University Admissions Application and supply three letters of recommendation.

Program-Specific Policies:

Policies

For policies governing all graduate programs, see AP.6 Graduate Policies.

Reduction of Credit

For students entering the doctoral program with a master's degree in a related field from an institution of higher education accredited by a Mason-recognized U.S. institutional accrediting agency or international equivalent, the number of required credits may be reduced up to 30 credits, subject to approval of the program faculty and the college's associate dean for student affairs. See AP.6.5.2 Reduction of Credits for more information.

Degree Requirements:

Students should refer to the Admissions & Policies tab for specific policies related to this program.

Core Courses

Geology and Earth Science Foundation		
GEOL 525	Modeling Earth Signals and Systems	3
GEOL 540	Modern Methods in Geology	3
GEOL 541	Great Events in Earth History	3
GEOL 601	The Lithosphere	3
GEOL 752	Earth Sciences in Academia	2
Geology and Earth Science Seminars		
Select a total of four credits in any combination of the following seminar courses:		4
GEOL 536	Paleontology Seminar	
GEOL 792	Seminar in Earth Systems Science, Geology, Earth Science	
Research Methods		
GEOL 720	Bayesian Methods in Geology and Earth Sciences	3
GEOL 996	Doctoral Reading and Research (repeat for a total of 15 credits)	15
STAT 634	Case Studies in Data Analysis	3
Total Credits		39

Restricted Elective Courses

Select 18 credits from the following, approved in advance by the Graduate Coordinator: [1]		18
GEOL 500	Selected Topics in Modern Geology	
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GEOL 504	Sedimentary Geology	
GEOL 506	Soil Science	
GEOL 510	Advanced Structural Geology	
GEOL 512	Invertebrate Paleontology	
GEOL 513	Hydrogeology	
GEOL 521	Geology of Energy Resources	
GEOL 532	Paleoclimatology	
GEOL 534	Vertebrate Paleontology	
GEOL 535	Quantitative Stratigraphy	
GEOL 553	Field Mapping Techniques	
GEOL 563	Coastal Morphology and Processes	
GEOL 565	Paleoceanography	
GEOL 603	Geochemistry	
GEOL 734	Paleobiology	
GEOL 741	Isotopes in Geology	
Total Credits		18

1 Select courses that have not previously been completed at the undergraduate course level.

Dissertation Committee

The student's dissertation committee must have at least three members who are full-time members of George Mason University's instructional faculty. The Dissertation Committee Chair must be a faculty member in the Department of Atmospheric, Oceanic, and Earth Sciences. The second member must be a faculty member in good standing at Mason. The third member of the committee may be from the Department of Atmospheric, Oceanic, and Earth Sciences or another academic unit at Mason. Students may select a fourth member for the committee from another academic unit or outside the institution, with approval of the PhD Program Director. This option typically would be employed in order to include an external expert relevant to the student's field of study.

Comprehensive Exam

The comprehensive exam includes written and oral components to assess whether students have the subject matter knowledge and skills to successfully propose and complete a dissertation research project and an oral component. Students must complete the comprehensive exam within two semesters after the completion of all core and concentration coursework on their approved program of study. The comprehensive exam will consist of a set of questions tailored to the individual student. The committee will be comprised of the same individuals as the Dissertation Committee. Exams will be graded on a pass/fail basis. Students must successfully pass both the written and oral portions of the comprehensive exam in order to advance to candidacy. Students who fail either the written or the oral portion of the comprehensive exam will be granted one attempt to retake the examination the following semester. Students who do not pass the second attempt will be dismissed from the PhD program.

Written Comprehensive Exam

The written portion of the comprehensive exam will assess the student's ability to apply theoretical concepts towards the designing of potential research studies necessary to write a doctoral dissertation. It will also assess the student's capability to form research questions and present appropriate methodologies to test such questions (including, for example: Study design, analytical model development, data acquisition or collection, data management, and analysis and interpretation). The questions on the exam will be linked with the student's program of study and proposed research subject matter.

Oral Comprehensive Exam

The oral portion of the comprehensive exam will assess the student's knowledge and comprehension of the subject matter background to the field of geology and Earth sciences as a whole, as well as the specific body of knowledge related to the student's chosen area of specialty and research. The student must demonstrate mastery in articulating answers including the limitations around data to prepare them for effectively working with various audiences.

Dissertation

GEOL 998	Doctoral Dissertation Proposal (repeated for a minimum of 12 credits)	12
GEOL 999	Doctoral Dissertation (repeated for a minimum of 3 credits)	3
Total Credits		15

Advancement to Candidacy

Advancement to candidacy is based upon the student's successful completion of all required coursework and passing the comprehensive examination. Advancement to candidacy is a prerequisite for admission into GEOL 998 Doctoral Dissertation Proposal.

Dissertation Proposal

Students who have advanced to candidacy begin working on the dissertation proposal the semester after passing their comprehensive exams by registering for GEOL 998 Doctoral Dissertation Proposal. Students design the conceptual framework for their research projects in consultation with the dissertation committee. A draft dissertation proposal should be submitted to the student's dissertation committee within two semesters of completing the comprehensive exam. The proposal should include a detailed literature review that provides the context and rationale for the research questions and describes the proposed study design and analytic methods. The

proposal must address the feasibility of completing the dissertation research within an appropriate time. A list of dissertation committee members must be included in the proposal, confirming each committee members' agreement to serve on the committee.

An oral proposal defense will be scheduled with all dissertation committee members in attendance. During the oral proposal defense, students describe their proposed research and address questions by the committee members. At the conclusion of the oral defense, the dissertation committee either approves the dissertation or provides written recommendations for improving the proposed research with clearly stated expectations for resubmission. All proposal defenses are open to faculty and students in the College of Science. Candidates attending the oral defense may be allowed to ask questions. The dissertation committee holds an executive session after the formal defense to finalize a decision for the student. Passing the proposal defense is a prerequisite for GEOL 999 Doctoral Dissertation. Failure to submit the proposal in a timely manner is grounds for academic probation.

Dissertation Defense

The dissertation defense is an oral presentation of the dissertation work in a public forum open to all members of the university community. An abstract and draft dissertation approved by the dissertation committee in conformance with University Library requirements is required before the defense can be scheduled. The student consults with the dissertation committee to identify a date and time for the dissertation defense. Once a date and time has been confirmed, the student works with the appropriate area administrative assistant to reserve a room for the defense. All dissertation committee members should be present. The dissertation committee convenes after the public session to discuss and approve the dissertation. The student is notified after the committee's executive session. The student is responsible for making all required edits before final acceptance of the dissertation adhering to the university's timeline for graduation.

Retroactive Requirements Updates:

Plan of Study:

Program Outcomes

Learning Outcomes

1. Demonstrate a breadth of knowledge of geology and earth sciences across the subfields of geology and earth sciences, along with a depth knowledge in their area(s) of specialization.
2. Exhibit expertise in research methodologies, analytical techniques, and interpretation of findings applicable to a variety of geologic research questions.
3. Effectively conduct critical reviews of relevant scientific literature.
4. Incorporate appropriate ethical standards in all research activities.
5. Produce original, reproducible research that contributes to the knowledge base of geology and earth sciences.
6. Expertly communicate research results to both scientific peers and general audiences.
7. Master the skills to conduct a research program including running a research laboratory and writing effective grant proposals.
8. Design instructional strategies in geology and Earth sciences that facilitate student learning in higher education.

Additional Program Information

This information is required by the Office of Accreditation and Program Integrity.

Courses offered via distance (if applicable):

What is the primary delivery format for the program?

Face-to-Face Only

Does any portion of this program occur off-campus?

No

Are you working with a vendor / other collaborators to offer your program?

No

Related Departments

Could this program prepare students for any type of professional licensure, in Virginia or elsewhere?

No

Are you adding or removing a licensure component?

No

Additional SCHEV & SACSCOC Information

Is the content of the new program closely related to that of an existing approved program at the same instructional level (i.e., baccalaureate, master's, doctoral)?

No

Is this new program considered to be "advancing the degree level of a currently approved program" (i.e. existing content is at lower degree level, new content is at the higher degree level)?

No

Is this new program considered to be "lowering the degree level of a currently approved program" (i.e. existing content is at higher degree level, new content is at the lower degree level)?

No

Is this a re-opening of a program that was closed to admission within the last five years?

No

What are the methods of delivery for the program?

Face-to-Face Only

Does this program include a course/credit-based competency-based education delivery option?

No

Percentage of total credits containing new course content. ("New course content" is defined by SACSCOC as content that is not currently included in an existing approved degree/certificate program at the same instructiona level. Do not exclude gen ed credits in calculations for undergraduate programs.)

25%-49%

Will any additional equipment/facilities be needed?

No

Will any additional faculty be required?

No

Will any additional financial resources be needed?

No

Additional library/learning resources needed?

No

OAPI Use Only – Determination of SACSCOC Impact

Comments or Notes

Does this program cover material which crosses into another department?

No

Additional Attachments

SCHEV Proposal PhD Geology Earth Sciences 03022022.pdf

Executive Summary

Currently, Virginia offers only one PhD degree program in Geology, Earth Sciences and Geoscience. Virginia will need additional doctoral-level geoscientists in the future to train other geoscientists, to lead at government agencies, and to staff museums and other informal educational positions. The proposed degree program is intended to respond to the growing demand for experts with knowledge in critical minerals exploration, ice sheet dynamics and sea level change, renewable energy resources and technologies, and the evolution of Earth surface systems on a warming planet. The proposed program addresses the need for trained professionals in the Earth sciences. The proposed program emphasizes a research-oriented, global systems approach to studying the Earth and its systems: the atmosphere, the hydrosphere, and the lithosphere, including their interrelationships with the biosphere. Emphasis is on the observation, measurement, and analysis of Earth's systems. The need for Earth scientists in Virginia is expected to increase due to needs for mineral resources (particularly for electronics), energy resources, and due to increased threats of coastal erosion and erosion due to changes in precipitation patterns due to climate change. George Mason University can help meet these needs with this proposed doctoral program.

Reviewer Comments

Susan Woodruff (swoodru3) (10/30/24 3:36 pm): Rollback: Please make changes to the curriculum based on feedback from the External Reviewers.

Yellia Seanor (yseanor) (11/11/24 8:25 am): Rollback: Roll back per Jennifer Bazaz Gettys.

Additional Comments

This program will need a new CIP code, the current one populated as I was working off of another PhD's template.

Is this course required of all students in this degree program?

%wi_required.eschtml%

Key: 965