Program Change Request

Date Submitted: 02/16/22 3:06 pm

Viewing: SC-BS-GEOL : Geology, BS

Last approved: 05/18/21 9:14 am

Last edit: 02/16/22 3:06 pm

Changes proposed by: jbazaz

Catalog Pages Using this Program

Geology, BS

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

No

Effective Catalog:	2022-2023
Program Level:	Undergraduate
Program Type:	Bachelor's
Degree Type:	Bachelor of Science
Title:	Geology, BS
Banner Title:	BS Geology
Registrar/OAPI Use Only – SCHEV Status	Approved
Registrar's Office Use Only – Program Start Term	
Registrar/OAPI Use Only – SCHEV Letter	
Registrar/OAPI Use Only – SACSCOC Status	
Concentration(s):	

In Workflow

1. **AOES Committee**
2. **AOES Chair**
3. **SC Curriculum Committee**
4. SC Associate Dean
5. Assoc Provost-Undergraduate
6. Registrar-Programs

Approval Path

1. 02/28/22 3:30 pm Barry Klinger (bklinger): Approved for AOES Committee
2. 03/01/22 8:28 am Mark Uhen (muhen): Approved for AOES Chair

History

1. Jul 22, 2020 by Tory Sarro (vsarro)
2. Jul 22, 2020 by Tory Sarro (vsarro)
3. Nov 24, 2020 by Jennifer Bazaz Gettys (jbazaz)
4. May 18, 2021 by Jennifer Bazaz Gettys (jbazaz)

	Associated Concentrations	Registrar's Office Use Only: Concentration Code
1	Earth Surface Processes	EP
2	Environmental Geoscience	EVGS
3	Geology	GEOL
4	Oceanography and Estuarine Science	OEST
5	Paleontology	PLEO

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: Adding GEOL 103 to GEOL 101.

Why: The previously 4-credit GEOL 101 has been decoupled into GEOL 101 (3cr), GEOL 103 (1cr).

What: Removed GGS 332 from an electives list.

Why: Course was inactivated.

Total Credits Required: Total credits: minimum 120

Registrar's Office Use Only - Program Code:

SC-BS-GEOL

Registrar/IRR Use Only – Program CIP Code 40.0601 - Geology/Earth Science, General.

Admission Requirements:

Admissions

University-wide admissions policies can be found in the Undergraduate Admissions Policies section of this catalog. To apply for this program, please complete the George Mason University Admissions Application.

Program-Specific Policies:

Policies

Students must fulfill all Requirements for Bachelor's Degrees, including the Mason Core.
For policies governing all undergraduate degrees, see AP.5 Undergraduate Policies.

Writing Intensive Requirement

GEOL 317 Geomorphology fulfills the writing intensive requirement for this major, with the exception of:

- The Environmental Geoscience Concentration, whereby GEOL 305 Environmental Geology fulfills the writing intensive requirement.
- The Paleontology Concentration, whereby GEOL 334 Vertebrate Paleontology fulfills the writing intensive requirement.

Degree Requirements:

This is a Green Leaf program.
Students should refer to the Admissions & Policies tab for specific policies related to this program.
Students must complete all coursework with a minimum GPA of 2.00.

Core Science and Mathematics

GEOL 101	Physical Geology (Mason Core)	4
& GEOL 103	and Physical Geology Lab	
GEOL 309	Oceanography	3
or BIOL 309	Oceanography	
GEOL 420	Earth Science and Policy (Mason Core)	3
CHEM 211	General Chemistry I (Mason Core)	4
& CHEM 213	and General Chemistry Laboratory I (Mason Core)	
CHEM 212	General Chemistry II (Mason Core)	4
& CHEM 214	and General Chemistry Laboratory II (Mason Core)	
MATH 113	Analytic Geometry and Calculus I (Mason Core)	4
MATH 114	Analytic Geometry and Calculus II	4
STAT 250	Introductory Statistics I (Mason Core)	3
Select one of the following options:		3-4
Option A:		
CLIM 111	Introduction to the Fundamentals of Atmospheric Science (Mason Core)	
CLIM 112	Introduction to the Fundamentals of Atmospheric Science Lab (Mason Core)	
Option B:		
PHYS 111	Introduction to the Fundamentals of Atmospheric Science (Mason Core)	
PHYS 112	Introduction to the Fundamentals of Atmospheric Science Lab (Mason Core)	
Option C:		

GGS 309	Introduction to Weather and Climate	
Total Credits		32-33

Physics

Select one 8-credit sequence from the following:		8
PHYS 160	University Physics I (Mason Core)	
& PHYS 161	and University Physics I Laboratory (Mason Core)	
& PHYS 260	and University Physics II (Mason Core)	
& PHYS 261	and University Physics II Laboratory (Mason Core)	
PHYS 243	College Physics I (Mason Core)	
& PHYS 244	and College Physics I Lab (Mason Core)	
& PHYS 245	and College Physics II (Mason Core)	
& PHYS 246	and College Physics II Lab (Mason Core)	
Total Credits		8

Concentration in Earth Surface Processes (EP)

This concentration focuses on a broad understanding of the physical processes and natural materials found at or near the Earth's surface that have produced the primary landforms and landscapes observed today. Fundamental concepts, methods and techniques of landscape analysis are also examined. Students choosing this concentration must complete the following coursework:

GEOL 102	Historical Geology (Mason Core)	4
& GEOL 104	and Historical Geology Laboratory (Mason Core)	
or EVPP 108	Ecosphere - Introduction to Environmental Science I-Lecture (Mason Core)	
& EVPP 109	and Ecosphere- Introduction to Environmental Science I- Lab (Mason Core)	
GEOL 302	Mineralogy	4
GEOL 303	Field Mapping Techniques	3
GEOL 306	Soil Science	3
GEOL 317	Geomorphology 1	4
GGS 311	Geographic Information Systems	3
Select 10-15 credits from the following:		10-15
GEOL 304	Sedimentary Geology	
GEOL 305	Environmental Geology	
GEOL 313	Hydrogeology	
GEOL 315	Topics in Geology II	
GEOL 363	Coastal Morphology and Processes	
GEOL 401	Structural Geology	
GEOL 403	Geochemistry	
GEOL 417	Geophysics	
Total Credits		31-36

1 Fulfills writing intensive requirement.

Concentration in Environmental Geoscience (EVGS)

This concentration provides the tools for applying geologic information (on soils, rocks, water, weather, and landscapes) to contemporary environmental problems (including: pollution, waste management, resource extraction, natural hazards, land-use, habitat restoration, species preservation, and human health). Environmental geoscience studies the physical environment in which biological interactions take place, whereby aiding the understanding of ecology. Students choosing this concentration must complete the following coursework:

GEOL 102	Historical Geology (Mason Core)	4
& GEOL 104	and Historical Geology Laboratory (Mason Core)	
GEOL 302	Mineralogy	4
GEOL 305	Environmental Geology 1	3
GEOL 306	Soil Science	3
GEOL 313	Hydrogeology	3
GEOL 320	Geology of Earth Resources	3
GEOL 321	Geology of Energy Resources	3
GEOL 403	Geochemistry	3
or CHEM 427	Aquatic Environmental Chemistry	
EVPP 336	Human Dimensions of the Environment	3
or EVPP 361	Introduction to Environmental Policy	
Select 6-12 credits from the following:		6-12
CLIM 101	Global Warming: Weather, Climate, and Society (Mason Core)	
CLIM 412	Physical Oceanography	
GEOL 304	Sedimentary Geology	
EVPP 201	Environment and You: Issues for the Twenty-First Century (Mason Core)	
EVPP 336	Human Dimensions of the Environment	
EVPP 361	Introduction to Environmental Policy	
EVPP 432	Energy Policy	
EVPP 436	The Human Dimensions of Global Climate Change	
GGS 302	Global Environmental Hazards	
GGS 311	Geographic Information Systems	
~~GGS 322~~	~~Course GGS 322 Not Found~~	
PHYS 331	Physics of Renewable Energy	
CONF 101	Conflict and Our World (Mason Core)	
INTS 211	Introduction to Conservation Studies (Mason Core)	
PRLS 300	People with Nature	
PRLS 402	Human Behavior in Natural Environments	
Total Credits		35-41

1 Fulfills writing intensive requirement for this concentration only.

Concentration in Geology (GEOL)

This concentration is fashioned after traditional geology bachelor's degrees. It allows graduates to be employed as geologists in the field or to pursue graduate studies in geology. Students choosing this concentration must complete the following coursework:

GEOL 102	Historical Geology (Mason Core)	4
& GEOL 104	and Historical Geology Laboratory (Mason Core)	
GEOL 302	Mineralogy	4
GEOL 304	Sedimentary Geology	4
GEOL 308	Igneous and Metamorphic Petrology	4
GEOL 312	Invertebrate Paleontology	4
GEOL 317	Geomorphology 1	4
GEOL 401	Structural Geology	4
Six credits of		6
GEOL 404	Geological Field Techniques 2	
Total Credits		34

1 Fulfills writing intensive requirement.

2 A 6-credit geology field camp may be substituted for this requirement, see advisor for details.

Concentration in Oceanography and Estuarine Science (OEST)

This concentration provides students with a comprehensive knowledge of oceanography. Additional coursework in physical and chemical oceanography give insight into the aquatic environment and its link to both ecosystems and climate. Within the concentration, students can choose an Open Ocean or Coastal Ocean option. The curriculum will emphasize local and regional case studies, in particular the Chesapeake Bay. The program will provide students with the basic training required to allow them to obtain entry level positions in oceanographic and estuarine career tracks or an appropriate graduate degree program. Students choosing this concentration must complete the following coursework:

CLIM 412	Physical Oceanography	3
or GEOL 412	Physical Oceanography	
GEOL 102	Historical Geology (Mason Core)	4
& GEOL 104	and Historical Geology Laboratory (Mason Core)	
GEOL 458	Chemical Oceanography	3
or CHEM 458	Chemical Oceanography	
Select one of the following 8-credit sequences:		8
BIOL 102	Introductory Biology I-Survey of Biodiversity and Ecology (Mason Core)	
& BIOL 103	and Introductory Biology II-Survey of Cell and Molecular Biology (Mason Core)	
& BIOL 105	and Introductory Biology II Laboratory (Mason Core)	
BIOL 213	Cell Structure and Function (Mason Core)	
& BIOL 300	and BioDiversity	

EVPP 108	Ecosphere - Introduction to Environmental Science I-Lecture (Mason Core)	
& EVPP 109	and Ecosphere- Introduction to Environmental Science I- Lab (Mason Core)	
& EVPP 112	and Ecosphere: Introduction to Environmental Science II-Lecture (Mason Core)	
& EVPP 113	and Ecosphere: Introduction to Environmental Science II–Lab (Mason Core)	
Select one of the following options:		15-16
Open Ocean Option:		
GEOL 364	Marine Geology	
BIOL 449	Marine Ecology	
Three additional courses from the electives list below (minimum of 9 credits)		
Coastal Ocean Option		
GEOL 363	Coastal Morphology and Processes	
EVPP 581	Estuarine and Coastal Ecology	
Three additional courses from the electives list below (minimum of 9 credits)		
Total Credits		33-34

Electives

GEOL 302	Mineralogy	4
GEOL 304	Sedimentary Geology	4
GEOL 308	Igneous and Metamorphic Petrology	4
GEOL 312	Invertebrate Paleontology	4
GEOL 363	Coastal Morphology and Processes	4
GEOL 364	Marine Geology	3
GEOL 565	Paleoceanography	3
BIOL 440	Field Biology 1	4
BIOL 449	Marine Ecology	3
EVPP 350	Freshwater Ecosystems	4
EVPP 377	Applied Ecology	3
EVPP 419	Marine Mammal Biology and Conservation	3
EVPP 581	Estuarine and Coastal Ecology	3
EVPP 582	Estuarine and Coastal Ecology Laboratory	1
INTS 395	Field-Based Work 2	1-18
Additional recommended course:		
RECR 161	Scuba Diving: Basic	2

1 When topic is Coral Reef Ecology

2 When topic is Exploring Underwater Ecology

Concentration in Paleontology (PLEO)

This concentration focuses on a broad understanding of Earth's history and the evolution of life on Earth as revealed through the fossil record. Fundamental concepts, methods and techniques of historical geology and paleontological data and analysis are also examined. This concentration may not be taken in conjunction with the Paleontology Minor. Students choosing this concentration must complete the following coursework:

GEOL 102	Historical Geology (Mason Core)	4
& GEOL 104	and Historical Geology Laboratory (Mason Core)	
GEOL 302	Mineralogy	4
GEOL 304	Sedimentary Geology	4
GEOL 312	Invertebrate Paleontology	4
GEOL 334	Vertebrate Paleontology 1	4
BIOL 103	Introductory Biology II-Survey of Cell and Molecular Biology (Mason Core)	4
& BIOL 105	and Introductory Biology II Laboratory (Mason Core)	
or BIOL 213	Cell Structure and Function (Mason Core)	
Select 9-10 credits from the following additional courses:		9-10
GEOL 306	Soil Science	
GEOL 317	Geomorphology	
GEOL 332	Paleoclimatology	
GEOL 364	Marine Geology	
GEOL 403	Geochemistry	
GEOL 412	Physical Oceanography	
GEOL 458	Chemical Oceanography	
GEOL 565	Paleoceanography	
Select 3-4 credits from the following:		3-4
BIOL 300	BioDiversity	
BIOL 320	Comparative Chordate Anatomy	
BIOL 331	Invertebrate Zoology	
BIOL 374	Biogeography: Space, Time, and Life	
or GGS 321	Biogeography	
BIOL 468	Vertebrate Natural History	
BIOL 470	Dinosaur Biology	
BIOL 471	Evolution	
Total Credits		36-38

1 Fulfills writing intensive requirement for this concentration only.

Retroactive Requirements Updates:

Please make all above changes (except program title change) retroactive options for students, effective for catalog years: 2019-2020; 2020-2021

- GEOL 102 replaced by GEOL 102 + GEOL 104
- BIOL 310 + BIOL 330 replaced by BIOL 300
- EVPP 110 replaced by EVPP 108 + 109
- EVPP 111 replaced by EVPP 112 + 113

Plan of Study:

Honors Information:

Honors in the Major

Geology majors who have completed 16 credits of math and science, including GEOL 302 Mineralogy, with a GPA of 3.00 or higher are eligible to enter the departmental honors program. Transfer students who have an incoming GPA of 3.10 or higher in math and science and a grade of 'B' or better in GEOL 302 Mineralogy are also eligible. To graduate with honors in Geology, students are required to maintain a minimum GPA of 3.00 in math and science courses and complete one of the two following sets of courses with an average GPA of 3.50 or better:

First Set of Courses

GEOL 410	Research Proposal Preparation	1
GEOL 411	Geological Research	3
GEOL 420	Earth Science and Policy (Mason Core)	3

Second Set of Courses

CLIM 408	Senior Research	3
CLIM 409	Research Internship	3
GEOL 420	Earth Science and Policy (Mason Core)	3

Program Outcomes

Program Outcomes

1. Comprehend important earth-science concepts that reflect the complexity of the integrated earth-ocean-atmosphere system. These concepts include (but are not limited to) (1) Earth materials, (2) tectonics, (3) basic dynamics of the oceans and atmosphere, (4) surficial processes land-ocean-atmosphere interactions.
2. Demonstrate intellectual and technical ability to observe, develop questions, describe, measure, classify, interpret, assess problems, and critically evaluate hypotheses or plans in field and laboratory settings.
3. Appreciate both team and individual approaches to scientific problem solving, and work effectively, thoroughly, efficiently and competently in either situation.
4. Develop the ability to observe and analyze geoscience problems in three dimensions and time.
5. Know how to perform their own research and to efficiently track down and critically evaluate primary literature on earth science topics to help them answer (or pose) scientific questions in the geosciences.
6. Demonstrate the ability to communicate scientific ideas and findings effectively in both oral presentations and writing to a wide range of audiences.
7. Conduct themselves professionally, rationally, and ethically.
8. Have the appropriate knowledge base from their individual concentrations to enter the workforce or to continue on to graduate school to ultimately enter industry, academia, or government service as a geoscientist.
9. Value scientific information in and of itself, and the process through which scientific knowledge is generated.
10. Be an open-minded (open to new scientific concepts and information), independent, and analytical thinker.

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 this change a simple retitling of an existing program, with no other changes, to any existing program content, curriculum requirements, etc?

No

Does this change represent a repackaging of content in an existing approved degree/certificate program at the same instructional level (i.e., baccalaureate, master's, or doctoral)?

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 instructional level. Do not exclude gen ed credits in calculations for undergraduate programs.)

0%-24%

Does this change include the addition of a distance education or face-to-face method of delivery for this program?

No

Does this change include the addition of a course/credit-based competency-based education delivery option?

No

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

Green Leaf Program Designation

Is this a Green Leaf program?	Yes
Green Leaf Designation	Sustainability-focused designation

Sustainability-focused academic programs require at least one green leaf course. Either that course is itself sustainability-focused or else the program requires a set of sustainability-related courses with aggregated substance equivalent to a sustainability-focused course.

Relationship to Existing Courses

Relationship to Existing Programs

List sustainability-focused courses

currently required in the degree program:

Does this program cover material which crosses into another department?

No

Additional Attachments RE_ Earth Science_Geology BS.pdf

SCHEV Proposal

Executive Summary

Reviewer Comments

Additional Comments

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

%wi_required.eschtml%

Key: 864