

Program Change Request

Date Submitted: 10/20/23 2:57 pm

Viewing: **SC-BS-GEOL : Geology, BS**

Last approved: 05/10/22 3:20 pm

Last edit: 03/27/24 2:57 pm

Changes proposed by: jbazaz

**Catalog Pages
Using this Program**
[Geology, BS](#)

No Longer
Anticipated closure
date (i.e., calendar
Rationale for

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

Yes

Requestor:

In Workflow

1. **AOES Curriculum Committee**
2. **AOES Chair**
3. **SC Curriculum Committee**
4. SC Assistant Dean
5. Assoc Provost-Undergraduate
6. Registrar:Concentrat Code
7. Registrar-Programs

Approval Path

1. 03/08/24 2:28 pm
Barry Klinger
(bklinger):
Approved for AOES Curriculum Committee
2. 03/09/24 11:00 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)

5. May 10, 2022 by
Jennifer Bazaz
Gettys (jbazaz)

Name	Extension	Email
Stacey Verardo	1045	sverardo@gmu.edu

Effective Catalog: 2023-2024

Program Level: Undergraduate

Program Type: Bachelor's

Degree Type: Bachelor of Science

Title: Geology, BS

Approval Criteria

1. What was the process used within your academic unit to approve the badge?
2. Who was involved in approving the badge?
3. What evidence was used to identify need/demand for the badge?
 - a. Have you ensured there are no other existing badges that address this need?
 - b. Has CPE confirmed the proposed badge does not duplicate existing content?
 - c. Has the instructor(s) for this badge experience been reviewed?
 - d. Is there a contact hour minimum?
 - e. Is an assessment required?
4. Does this badge provide a benefit for current or future students?
5. Is this badge co-sponsored with another organization, association, or unit? (If you would like an endorsement, please provide details.)
 - a. What is the organization, program, or department?

Earning Criteria

Course:

Badge:

Participant:

Payment:

Portfolio:

Presentation:

Assessment:

Credential:

Education

Other:

Project:

Professional

Schedule/Registration:

Volunteer:

Skills Tag

Skills Tag

Badge Attributes

Please select one from each category:

Achievement Type:

Mastery Level:

Time Commitment:

Cost:

Industry Standards:

Recommendations:

Issuance information and Pricing

Pricing: See <https://cne.gmu.edu/digitalbadgespricing/> for more information

Estimated Number of Badges Expected to be Issued:

Notes:

- All badge requests will be routed to CBE for review and approval. Please allow 7
- A Mason Digital Credentials Advisory Group may be developed to review badge

Banner Title: BS Geology

Is this a retitling of an existing program?

Existing Program

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):

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

INTO Major(s):

Registrar/IRR Use Only – Concentration CIP Code

College/School: College of Science

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

Jointly Owned Program? No

Participating

Participating

Justification

What: In this proposal, we will be modifying four of its five concentrations (all but Environmental Geoscience).

Why: All curriculum modifications were created to make it easier for students to understand and navigate a path toward graduation.

What: Updating GPA requirement.

Why: To keep all AOES undergraduate degrees consistent.

Catalog Published Information

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 ([Mason Core](#)) fulfills the writing intensive requirement for this major, with the exception of:

- The Environmental Geoscience Concentration, whereby [GEOL 305](#) Environmental Geology ([Mason Core](#)) fulfills the writing intensive requirement.

- The Paleontology Concentration, whereby [GEOL 334](#) Vertebrate Paleontology ([Mason Core](#)) 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 [2.30](#) ~~2.00~~.

Core Courses ~~Science and Mathematics~~ 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

Geology & Earth Science

- GEOL 101 Physical Geology ([Mason Core](#)) 4
 & GEOL 103 and Physical Geology Lab ([Mason Core](#))
 GEOL 102 Historical Geology ([Mason Core](#)) 4
 & GEOL 104 and Historical Geology Laboratory ([Mason Core](#))
 GEOL 309 Oceanography 3
 or BIOL 309 Oceanography
 or EVPP 309 Oceanography
 GEOL 420 Earth Science and Policy ([Mason Core](#)) 3

Chemistry

- 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](#))

Mathematics

- MATH 113 Analytic Geometry and Calculus I ([Mason Core](#)) 4-6
 or MATH 123 Calculus with Algebra/Trigonometry, Part A
 & MATH 124 and Calculus with Algebra/Trigonometry, Part B ([Mason Core](#))
 MATH 114 Analytic Geometry and Calculus II 4
 STAT 250 Introductory Statistics I ([Mason Core](#)) 3

Physics

Select one option from the following: 8

Option One

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)

Option Two

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)

Additional Science

Select one of the following three options:

3-4

Option A:Option One

CLIM 111 Introduction to the Fundamentals of Atmospheric Science (Mason Core)
 & CLIM 112 and Introduction to the Fundamentals of Atmospheric Science Lab (Mason Core)
~~CLIM-112 Introduction to the Fundamentals of Atmospheric Science Lab (Mason Core)~~

Option B:Option Two

PHYS 111 Introduction to the Fundamentals of Atmospheric Science (Mason Core)
 & PHYS 112 and Introduction to the Fundamentals of Atmospheric Science Lab (Mason Core)
~~PHYS-112 Introduction to the Fundamentals of Atmospheric Science Lab (Mason Core)~~

Option C:Option Three

GGS 309 Introduction to Weather and Climate

Total Credits

44-47

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 306 Soil Science 3
GEOL 313 Hydrogeology 3
~~GEOL-315 Topics in Geology II~~
GEOL 317 Geomorphology (Mason Core) 1 4
GEOL 403 Geochemistry 3
Select at least 9 credits from the following: 9

GEOL 303	Field Mapping Techniques
GEOL 304	Sedimentary Geology
GEOL 305	Environmental Geology (Mason Core)
GEOL 308	Igneous and Metamorphic Petrology
GEOL 320	Geology of Earth Resources
GEOL 321	Geology of Energy Resources
GEOL 340	Modern Methods in Geology
GEOL 363	Coastal Morphology and Processes
GEOL 392	Geology and Earth Science Seminar
GEOL 401	Structural Geology
GEOL 417	Geophysics
GEOL 441	Great Events in Earth History
GGS 311	Geographic Information Systems

Select ~~10-15 credits from the following:~~

~~10-15~~

Total Credits

26

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 (Mason Core) 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	Tackling Wicked Problems in Society the Environment (Mason Core)	3
or EVPP 361	Introduction to Environmental Policy	

Select ~~6-12 credits from the following:~~

~~6-12~~

Select at least 9 credits from the following:

9

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	Tackling Wicked Problems in Society the Environment (Mason Core)
EVPP 361	Introduction to Environmental Policy
EVPP 432	Energy Policy
EVPP 436	Politics of Climate Change Governance
GGS 302	Global Environmental Hazards
GGS 311	Geographic Information Systems
PHYS 331	Physics of Renewable Energy
CONF 101	Conflict and Our World (Mason Core)
INTS 211	Introduction to Conservation Studies (Mason Core)
PRLS 300	Course PRLS 300 Not Found
PRLS 402	Course PRLS 402 Not Found

Total Credits

31

1

Fulfills writing intensive requirement for this concentration only.

Concentration in General 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 (Mason Core) 1	4
GEOL 401	Structural Geology	4
Six credits of		6
GEOL 404	Geological Field Techniques 2	6
Total Credits		30

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 Marine Estuarine Science (OMAR) (~~ΘEST~~)

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: **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	
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	
<u>GEOL 363</u>	Coastal Morphology and Processes	4
EVPP 581	Estuarine and Coastal Ecology	

Three additional courses from the electives list below (minimum of 9 credits)

<u>GEOL 364</u>	Marine Geology	3
BIOL 449	Marine Ecology	

Three additional courses from the electives list below (minimum of 9 credits)

Coastal Ocean Option

<u>GEOL 403</u>	<u>Geochemistry</u>	<u>3</u>
<u>GEOL 412</u>	<u>Physical Oceanography</u>	<u>3</u>
<u>or CLIM 412</u>	<u>Physical Oceanography</u>	

Select one sequence from the following: 8

<u>BIOL 102</u>	Introductory Biology I-Survey of Biodiversity and Ecology (<u>Mason Core</u>)
& <u>BIOL 103</u>	and Introductory Biology II-Survey of Cell and Molecular Biology (<u>Mason Core</u>)
& <u>BIOL 105</u>	and Introductory Biology II Laboratory (<u>Mason Core</u>)
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:~~

Select at least 9 credits from the following:

9

- [GEOL 302](#) [Mineralogy](#)
[GEOL 304](#) [Sedimentary Geology](#)
[GEOL 308](#) [Igneous and Metamorphic Petrology](#)
[GEOL 312](#) [Invertebrate Paleontology](#)
[GEOL 332](#) [Paleoclimatology](#)
[GEOL 340](#) [Modern Methods in Geology](#)
[GEOL 392](#) [Geology and Earth Science Seminar](#)

Total Credits

30

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 ([Mason Core](#)) 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

[BIOL 213](#) [Cell Structure and Function \(Mason Core\)](#) 4

[BIOL 300](#) BioDiversity 4

Select at least 9 credits from the following: 9

- [GEOL 306](#) Soil Science
[GEOL 317](#) Geomorphology ([Mason Core](#))
[GEOL 332](#) Paleoclimatology
[GEOL 340](#) [Modern Methods in Geology](#)

[GEOL 364](#) Marine Geology
[GEOL 392](#) Geology and Earth Science Seminar
[GEOL 403](#) Geochemistry
[GEOL 412](#) Physical Oceanography
~~GEOL 458~~ ~~Chemical Oceanography~~
~~GEOL 565~~ ~~Paleoceanography~~
[GEOL 441](#) Great Events in Earth History

Select 3-4 credits from the following:

3-4

[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~~ ~~Course BIOL 470 Not Found~~
[BIOL 471](#) Evolution

Total Credits

36-37

1

Fulfills writing intensive requirement for this concentration only.

**Retroactive
Requirements
Updates:**

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 ([Mason Core](#)) 3
[CLIM 409](#) Research Internship 3
[GEOL 420](#) Earth Science and Policy ([Mason Core](#)) 3

Accelerated
Description/Dual

Degree
Description:

INTO-Mason
Requirements:

College
Requirements &
Policies:

Department /
Academic Unit
Requirements &
Policies:

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):

Indicate whether students are able

What is the primary delivery format for the program? Face-to-Face Only

Does any portion of this program occur off-campus?

No

Off-campus details:

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

No

Please explain:

Related Departments

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

No

Please explain:

Are you adding or removing a licensure component?

No

Please explain:

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)?

Which existing approved program(s)?

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)?

Which existing approved program(s)?

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)?

Which existing approved program(s)?

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

Date of Program Closure

What are the methods of delivery for the program?

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

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

Which existing approved program(s)?

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

What is the new method of delivery?

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

Description of institutional impact:

Will any additional faculty be required?

No

Description of institutional impact:

Will any additional financial resources be needed?

No

Description of institutional impact:

Additional library/learning resources needed?

No

Description of institutional impact:

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:

Sustainability-related academic programs either require at least one sustainability-related course or else offer any green leaf course as an option or elective *

List sustainability-related courses currently required in the degree

Does this program cover material which crosses into another department?

No

Impacted Departments

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.eshtml%

