

Program Change Request

Date Submitted: 02/19/21 8:37 am

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

Last approved: 11/24/20 3:22 pm

Last edit: 02/19/21 8:37 am

Changes proposed by: jbazaz

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

2021 2022
Rationale for

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

No

Requester:

Effective Catalog: 2021-2022

Program Level: Undergraduate

Program Type: Bachelor's

Degree Type: Bachelor of Science

Title:

Geology, BS

Banner Title: BS Geology

Is this a retitling of an existing

Existing Program

Registrar/OAPI Use Only – SCHEV Status Approved

Registrar’s Office Use Only – Program Start Term

Registrar/OAPI Use Only – SCHEV

In Workflow

1. **AOES Committee**
2. **AOES Chair**
3. **SC Curriculum Committee**
4. SC Associate Dean
5. SC CAT Editor
6. Assoc Provost- Undergraduate
7. Registrar-Programs: Duration
8. Registrar-Programs

Approval Path

1. 03/01/21 9:19 pm
Barry Klinger (bklinger):
Approved for AOES Committee
2. 03/01/21 10:00 pm
Jim Kinter (ikinter):
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)

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	Geology	GEOL
4	Oceanography and Estuarine Science	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

Biology recently shuffled some course numbers around, the included updates reflect the newly numbered course substitutions (BIOL 106 and BIOL 107 replaced with BIOL 102 and BIOL 105).

Catalog Published Information

Total Credits Total credits: minimum 120

Required:

Registrar's Office Use Only - Program Code:

SC-BS-GEOL

Registrar/IRR Use 40.0601 - Geology/Earth Science, General.

**Only – Program CIP
Code**

**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	Introductory Geology I (Mason Core)	4
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](#) Issues in Global Change

[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 103](#) [Introductory Biology II-Survey of Cell and Molecular Biology \(Mason Core\)](#)
 & [BIOL 107](#) [and Intro Biology II Lecture \(Mason Core\)](#)
 & [BIOL 106](#) [and Introductory Biology II Laboratory \(Mason Core\)](#)

**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

<u>GEOL 302</u>	Mineralogy	4
<u>GEOL 304</u>	Sedimentary Geology	4
<u>GEOL 308</u>	Igneous and Metamorphic Petrology	4
<u>GEOL 312</u>	Invertebrate Paleontology	4
<u>GEOL 363</u>	Coastal Morphology and Processes	4
<u>GEOL 364</u>	Marine Geology	3
<u>GEOL 565</u>	Paleoceanography	3
<u>BIOL 440</u>	Field Biology 1	4
<u>BIOL 449</u>	Marine Ecology	3
<u>EVPP 350</u>	Freshwater Ecosystems	4
<u>EVPP 377</u>	Applied Ecology	3
<u>EVPP 419</u>	Marine Mammal Biology and Conservation	3
<u>EVPP 581</u>	Estuarine and Coastal Ecology	3
<u>EVPP 582</u>	Estuarine and Coastal Ecology Laboratory	1
<u>INTS 395</u>	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

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

Are you changing the total number of credits required for this program?

No

Are you changing the delivery format in any way (e.g adding an online option)?

No

Are you adding/removing a licensure option which was approved by SCHEV?

No

Will any portion of this program be offered at an off-campus location?

No

What off-campus location(s)? List all

What percentage of credits toward this program are offered at the off-campus location? Please list percentages by site (i.e. 15% at Site A, 35% at Site B etc.)

Will this program change affect any specialized accreditation?

No

Is the content of the new program closely related to that of an existing approved program?

No

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)?

No

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)?

No

Which existing approved program(s)?

Does this change represent a repackaging of content in an existing approved degree/certificate program?

No

Which existing approved program(s)?

Percentage of total credits containing new course content, excluding gen ed courses for undergraduate program: ("New content" means content that is not currently included in an existing approved degree/certificate program.) Please choose a percentage (i.e. 0%-100%)

less than 25%

Are the total credits for the program increasing or decreasing by more than 3 credits?

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:

Will any 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

List sustainability-related courses currently required

Does this program cover material which crosses into another department?

No

Impacted

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%

Attached