

College of Science  
Department of Geosciences  
Bachelor of Science in Geosciences (BS)  
**Earth Science Education (ESED) Option**  
For students graduating in calendar year 2022  
and for student date of entry under UG Catalog 2020-2021

<b><u>I. PATHWAYS TO GENERAL EDUCATION REQUIREMENTS (45 credits*)</u></b>		
Pathways requirements and approved courses are available online: <a href="http://www.cle.prov.vt.edu/guides/index.html">http://www.cle.prov.vt.edu/guides/index.html</a>		
<b>Concept 1: Discourse (9 credits)</b>		
(Foundation: 6 credits)	<u>ENGL 1105 (3)</u>	<u>ENGL 1106 (3)</u>
(Advanced: 3 credits)	Completed by major/option requirements	
<b>Concept 2: Critical Thinking in the Humanities (6 credits)</b>		
(Select from approved Pathways courses)	_____ (3)	_____ (3)
<b>Concept 3: Reasoning in the Social Sciences (6 credits)</b>	Completed by major/option requirements	
<b>Concept 4: Reasoning in the Natural Sciences (6 credits)</b>	Completed by major/option requirements	
<b>Concept 5: Quantitative and Computational Thinking (9 credits)</b>		
(Foundation: 6 credits)	Completed by major/option requirements	
(Advanced: 3 credits)	Completed by major/option requirements	
<b>Concept 6: Critique and Practice in Design and the Arts (6 credits)</b>		
(Select from approved Pathways courses)	_____ (3 Arts)	_____ (3 Design)
<b>Concept 7: Critical Analysis of Identity &amp; Equity in the US (3 credits)</b>	Completed by major/option requirements	

*\* If requirements completed as outlined, 27 credit hours of Pathways will be satisfied by major/option requirements*

<b>II. GEOS Degree Core (19 credits)</b>	_____	Sem†	
GEOS 2024 Earth's Dynamic Systems	_____	(8)	F
GEOS 2444 Geoscience Field Observations. (Pre: (1004, 1104) or 2024 or 2104)	_____	(2)	S
GEOS 3204 Sedimentology Stratigraphy. (Pre: 1004 or 2024 or 2104)	_____	(3)	F
GEOS 3404 Elements of Structural Geology. (Pre: 1004 or 2024 or 2104)	_____	(3)	F
GEOS 3504 Mineralogy. (Pre: CHEM 1035)	_____	(3)	F

<b>III. GEOS Major Requirements (19 credits)*</b>	_____	Sem†	Meets Pathways:
GEOS 2004 Geoscience Fundamentals	_____	(3)	S
GEOS 4024* Senior Seminar. (Pre: 2004, 2024, 2444, 3204, 3404, 3504)	_____	(3)	S 1 advanced
GEOG 2084 Principles of Geographic Infographic Systems	_____	(3)	
CHEM 1035* General Chemistry (Co: MATH 1025 or MATH 1225)	_____	(3)	4
CHEM 1045* General Chemistry Laboratory (Co: 1035)	_____	(1)	4
STAT 3005* Statistical Methods. (Pre: MATH 1025 or MATH 1225)	_____	(3)	5 advanced
<b>OR</b> STAT 3615* Biological Statistics. (Pre: MATH 1205 or MATH 1525 or MATH 1225 or MATH 1025 or MATH 1524 or ISC 1105)			
<b>Choose 1 course from:</b>			
GEOS 3024 Computational Methods in Geosciences. (Pre: (1004 or 2024 or 2104), (MATH 1225 or MATH 1025))	_____	(3)	
CS 1044 Intro to Programming in C	_____		
CS 1064 Intro to Programming in Python	_____		

\* Credits may double-count for Major Requirements and Pathways (Section I)

<b>IV. ESED Option Requirements (44-46 credits)*</b>	_____	Sem†	Meets Pathways
<i>Math and Physics: Choose one sequence from below</i>			
<u>Sequence 1#</u> MATH 1025* (3) MATH 1026* (3) PHYS 2205*, 2215* (4)	OR	<u>Sequence 2# (preferred)</u> MATH 1225* (4) MATH 1226* (4) PHYS 2305* (4)	
		_____	(3 or 4)
		_____	(3 or 4)
		_____	(4)
BIOL 1105* & 1115 Principles of Biology and Laboratory	_____	(3), ___	(1) 4
<b>Choose 1 of the following courses with lab:</b>			
CHEM 1036* & 1046* General Chemistry (Pre: 1035) & Laboratory (Co: 1036)			4
BIOL 1106* & 1116 Principles of Biology and Laboratory (Co: 1106)	_____	(3), ___	(1) 4
PHYS 2206* & 2216* General Physics (Pre: 2205 or 2305) and Laboratory (Pre: 2215; Co: 2206)			4
<b>OR</b> PHYS 2306* Foundations of Physics (Pre: 2305, (MATH 1206 or MATH 1206H or MATH 1226)			
GEOG 1514 Meteorology	_____	(3)	
EDCI 4024 Humanizing the K-12 Classroom (Pre: Jr. Standing)	_____	(3)	
EDEP 2444* Motivating Yourself and Others	_____	(3)	3
EDCI 3024* Issues in American Schooling	_____	(3)	3, 7
PHYS 1055* Introduction to Astronomy	_____	(3)	4
<b>OR</b> GEOS 2014* Missions to the Planets			F 4
GEOS 1024* Earth's Resources, Society and Environment	_____	(3)	F,S 4
<b>OR</b> GEOS 1064* Climate History: Past, Present and Future			4
GEOS 3034 Oceanography	_____	(3)	S
GEOS 3014 Environmental Geosciences (Pre: 1004 or 1024 or 2024 or 2104)	_____	(3)	S
GEOS 3044 Geosciences Outreach (Pre: 2024 or (1004, 1104) or (1104, 2104))	_____	(2)	

\* Credits may double-count for Option Requirements and Pathways (Section I)

<b>V. ESED Option Electives (9-10 credits)</b>	_____ ( )	Sem†
<b><u>Choose 9-10 credits from the following list:</u></b>		
GEOS 3104 Elementary Geophysics (3) (Pre: (1004 or 2024 or 2104), (MATH 1026 or MATH 1226), (PHYS 2205 or 2305))	_____ ( )	S
GEOS 3604 Paleontology (3) (Pre: (1004, 1014) or 2024)	_____ ( )	S
GEOS 3704 Igneous & Metamorphic Rocks (3) (Pre: 2024 or (1004, 1104))	_____ ( )	S
GEOS 4804 Groundwater Hydrology (3) (Pre: MATH 1226 or MATH 2024), (PHYS 2205 or PHYS 2305)		F,S
GEOS 4924 Tectonics (4) (Pre: MATH 1025 or MATH 1225), (PHYS 2205 or PHYS 2305)		S
FREC 3604 Climate Science (3). (Pre: MATH 1026 or 1206 or 1226 or 2015)		
<b><u>VI. FREE ELECTIVES</u></b>	_____ ( )	_____ ( )
Complete remaining credit hours needed to satisfy degree 120 credit hour requirement	_____ ( )	_____ ( )

**NOTES:**

† Semester of course offering only noted for GEOS courses Semester offered is subject to change. Please consult the timetable or your advisor for current information.

Prerequisites

# See University Course Catalog for prerequisites

Except when noted with a #, all prerequisites are listed on the checksheet. There are no hidden prerequisites, although some of the courses listed are prerequisites for other courses.

Even when listed, prerequisites are subject to change. Please consult University Course Catalog for current information.

Acceptable substitutions

GEOS 1004, 1104, 1014 for GEOS 2024

GEOS 2104, 1014 for GEOS 2024

CHEM 1055 or CHEM 1055H for CHEM 1035

CHEM 1065 for CHEM 1045

ENGL 1204H for ENGL 1106

COMM 1015 for ENGL 1105 and COMM 1016 for ENGL 1106

CS 1344 for CS 1044

Foreign language requirement

Students who did not successfully complete at least two years of a single foreign, classical, or sign language during high school must successfully complete six semester hours of a single foreign, classical, or sign language at the college level. Courses taken to meet this requirement do not count toward the hours required for graduation. Please consult the Undergraduate Catalog for details.

Satisfactory progress toward degree (Policy 91)

1. By 60 hours attempted at Virginia Tech, students must have completed the following courses:

GEOS 2004, 2024 (or 1004, 1104, 1014 or 2104, 1014), 2444, 3504

MATH 1025 or 1225

CHEM 1035, 1045

PHYS 2205, 2215 or 2305

2. Students must achieve an overall GPA of 2.0 and an in-major GPA of 2.5 upon attempting 15 GEOS credit hours (including transfer credit, courses completed with a grade of "W", advanced placement or IB credit)

Graduation requirements

Graduation requires completion of a minimum of 120 credit hours with a GPA of 2.0 or greater for all hours attempted. In addition, students must have an in-major GPA of 2.5 or greater. The in-major GPA is calculated from all GEOS courses.