B.S. IN GEOSCIENCE - EARTH SYSTEMS CONCENTRATION

Curriculum

Code	Title	Credits
	ATION REQUIREMENTS (https://undergraduate/general-education-	
Academic Foundation	one	
First Year Experience		4
English Composition	•	6-7
Mathematics requires	-	3-4
Interdisciplinary requ		3
Diverse Communitie		3
Ethics requirement	s requirement	3
Distributed Discipli	inary Foundations	3
Science requirement	mary 1 oundations	6-8
Behavioral & Social	Science requirement	6
Humanities requirem	-	6
Arts requirement	iciit	3
ADDITIONAL BA	ACCALAURFATE	3
	6 (https://catalog.wcupa.edu/	
	eral-education-requirements/)	
University Requiren	nents	
Writing Emphasis re	quirement	9
Speaking Emphasis r	requirement	9
Degree Requiremen	its	
Capstone requiremen	nt	1-15
MAJOR REQUIRE	EMENTS	
Major Core Courses	3	
ESS 101	Introduction to Geology	3
ESS 201	Field Geology	3
ESS 204	Historical Geology	3
ESS 301	Environmental Geochemistry	3
ESS 302	Mineralogy	3
ESS 331	Introduction to Paleontology	3
ESS 343	Geomorphology	3
ESS 405	Igneous and Metamorphic Petrology	3
ESS 420	Structural Geology	3
ESS 439	Hydrogeology	3
ESS 450	Sedimentation & Stratigraphy	3
Other Required Cou		
BIO 110	General Biology I	4
MAT 115	Algebra, Functions, and Trigonometry	3
or MAT 131	Precalculus	
or MAT 143	Brief Calculus	
or MAT 145	Calculus for the Life Sciences	
or MAT 161	Calculus I	
MAT 121	Introduction to Statistics I	3
CHE 103	General Chemistry I	3
CRL 103	General Chemistry I Lab	1
PHY 130	General Physics I	4
or PHY 170	Physics I	
	Humans and the Environment	3
or SCB 210	The Origin of Life and the Universe	
ESS 311	Introduction to Astronomy	3

ESS 330	Introduction to Oceanography	3
ESS 370	Atmospheric Science	3
ESS 347	Earth & Space Science Seminar	1
ESS 447	Earth and Space Science Senior Seminar	1
Capstone Require	ment	
ESS 499	Geoscience Research Methods ¹	3
Earth and Space S	cience Electives	
Select any two ESS	S courses at the 300 or 400 level	6
Select other 200-40	00 level ESS electives to reach 120 credits	
courses within the	etter must be achieved for all required department including the required those in biology, chemistry, math, and	
Total Minimum Credits Required		120

¹ This course fulfills the Capstone requirement.

Accelerated B.S. in Geoscience - Earth Systems Concentration to M.S. in Geoscience Program

Any junior Geoscience-Earth Systems student with a 3.0 cumulative GPA or higher may substitute up to 9 graduate credits to satisfy the B.S. program.

Code	Title	Credits
Elective Courses		
Select from the cou	rses below:	9
ESS 507	Geology of the Solar System	
ESS 532	Advanced Oceanography	
ESS 535	Remote Sensing	
ESS 542	Geophysics	
ESS 544	Geomorphology II	
ESS 548	International Geology Field Studies	
ESS 549	Advanced Hydrogeology	
ESS 555	Intermediate Astronomy	
ESS 562	History of Astronomy	
ESS 571	Advanced Meteorology	
ESS 580	Special Problems	
ESS 590	Fundamentals of Soil	
ESS 591	Independent Study	
ESS 594	Geology of Northwestern National Parks	

Sample Course Plan

To track their individual degree progress, students are advised to access their Degree Audit via RamPortal regularly. For more information, visit the Degree Audit FAQ webpage (https://www.wcupa.edu/academicEnterpriseSystems/student-system-modernization/degree-audit-faqs.aspx).

The following is a sample suggested course sequence for this program; course offerings and availability are not guaranteed. Students should consult their academic advisor with any questions.

B.S. in Geoscience - Earth Systems Concentration

Course	Title	Credits
Year One		
Fall		
ESS 101	Introduction to Geology	3

or SCB 210	Humans and the Environment or The Origin of Life and the Universe	3
MAT 115 or MAT 121	Algebra, Functions, and Trigonometry or Introduction to Statistics I	3
WRT 120	Effective Writing I	3
FYE 100X	First Year Experience	4
	Credits	16
Spring		
ESS 201	Field Geology	3
or ESS 204	or Historical Geology	_
MAT 121	Introduction to Statistics I	3
or	or Algebra, Functions, and	
MAT 115	Trigonometry	
BIO 110	General Biology I	4
WRT 2XX	200-level WRT Course	3
Behavioral &	Social Science Gen Ed	3
	Credits	16
Year Two Fall		
ESS 204	Historical Geology	3
or ESS 201	or Field Geology	
ESS 201	Cananal Chamisture I	4
CHE 103 & CRL 103	General Chemistry I and General Chemistry I Lab	4
Humanities C	•	3
	munities Gen Ed	3
	phasis Gen Ed	3
opening Bin	Credits	
Spring	Credits	16
Spring ESS 301		
ESS 301	Environmental Geochemistry	3
ESS 301 ESS 302	Environmental Geochemistry Mineralogy	3
ESS 301 ESS 302 Behavioral &	Environmental Geochemistry Mineralogy Social Science Gen Ed	3 3 3
ESS 301 ESS 302 Behavioral & Humanities C	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed	3 3 3 3
ESS 301 ESS 302 Behavioral & Humanities C	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED)	3 3 3 3 4
ESS 301 ESS 302 Behavioral & Humanities (Elective (CH	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed	3 3 3 3
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED)	3 3 3 3 4
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits	3 3 3 3 4 16
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall ESS 311	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy	3 3 3 3 4 16
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall ESS 311 ESS 330	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography	3 3 3 3 4 16
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall ESS 311 ESS 330 ESS 347	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar	3 3 3 4 16
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall ESS 311 ESS 330 ESS 347 ESS 370	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar Introduction to Meteorology	3 3 3 4 16 3 3 3 1
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall ESS 311 ESS 330 ESS 347 ESS 370 PHY 130	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar Introduction to Meteorology General Physics I	3 3 3 4 16 3 3 3 4
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall ESS 311 ESS 330 ESS 347 ESS 370 PHY 130	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar Introduction to Meteorology General Physics I phasis Gen Ed	3 3 3 4 16 3 3 1 3 4 3
ESS 301 ESS 302 Behavioral & Humanities (Elective (CH Year Three Fall ESS 311 ESS 330 ESS 347 ESS 370 PHY 130 Speaking Em	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar Introduction to Meteorology General Physics I	3 3 3 4 16 3 3 3 4
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall ESS 311 ESS 330 ESS 347 ESS 370 PHY 130 Speaking Em Spring	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar Introduction to Meteorology General Physics I phasis Gen Ed Credits	3 3 3 4 16 3 3 4 3 17
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall ESS 311 ESS 330 ESS 347 ESS 370 PHY 130 Speaking Em Spring ESS 331	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar Introduction to Meteorology General Physics I phasis Gen Ed Credits Introduction to Paleontology	3 3 3 4 16 3 3 4 3 17
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall ESS 311 ESS 330 ESS 347 ESS 370 PHY 130 Speaking Em Spring ESS 331 ESS 331 ESS 331	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar Introduction to Meteorology General Physics I phasis Gen Ed Credits Introduction to Paleontology Geomorphology	3 3 3 4 16 3 3 4 3 17
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall ESS 311 ESS 330 ESS 347 ESS 370 PHY 130 Speaking Em Spring ESS 331 ESS 331 ESS 343 ESS 405	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar Introduction to Meteorology General Physics I phasis Gen Ed Credits Introduction to Paleontology Geomorphology Igneous and Metamorphic Petrology	3 3 3 4 16 3 3 1 3 4 3 17
ESS 301 ESS 302 Behavioral & Humanities (CElective (CH Year Three Fall ESS 311 ESS 330 ESS 347 ESS 370 PHY 130 Speaking Em Spring ESS 331 ESS 343 ESS 445 ESS 445 ESS 420	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar Introduction to Meteorology General Physics I phasis Gen Ed Credits Introduction to Paleontology Geomorphology Igneous and Metamorphic Petrology Structural Geology	3 3 3 4 16 3 3 1 3 3 17 3 3 3 3 3 3 3 3 3 3
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall ESS 311 ESS 330 ESS 347 ESS 370 PHY 130 Speaking Em Spring ESS 331 ESS 331 ESS 343 ESS 405	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar Introduction to Meteorology General Physics I phasis Gen Ed Credits Introduction to Paleontology Geomorphology Igneous and Metamorphic Petrology Structural Geology	3 3 3 4 16 3 3 1 3 4 3 17
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall ESS 311 ESS 330 ESS 347 ESS 370 PHY 130 Speaking Em Spring ESS 331 ESS 331 ESS 343 ESS 405 ESS 420 Ethics Gen E	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar Introduction to Meteorology General Physics I phasis Gen Ed Credits Introduction to Paleontology Geomorphology Igneous and Metamorphic Petrology Structural Geology	3 3 3 4 16 3 3 4 3 17 3 3 3 3 3 3 3 3 3 3 3 3
ESS 301 ESS 302 Behavioral & Humanities (CElective (CH Year Three Fall ESS 311 ESS 330 ESS 347 ESS 370 PHY 130 Speaking Em Spring ESS 331 ESS 343 ESS 445 ESS 445 ESS 420	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar Introduction to Meteorology General Physics I phasis Gen Ed Credits Introduction to Paleontology Geomorphology Igneous and Metamorphic Petrology Structural Geology	3 3 3 4 16 3 3 4 3 17 3 3 3 3 3 3 3 3 3 3 3 3
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall ESS 311 ESS 330 ESS 347 ESS 370 PHY 130 Speaking Em Spring ESS 331 ESS 331 ESS 343 ESS 405 ESS 420 Ethics Gen E Year Four Fall	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar Introduction to Meteorology General Physics I phasis Gen Ed Credits Introduction to Paleontology Geomorphology Igneous and Metamorphic Petrology Structural Geology Ed Credits	3 3 3 4 16 3 3 4 3 17 3 3 3 3 3 3 3 3 3 3 3 3
ESS 301 ESS 302 Behavioral & Humanities C Elective (CH Year Three Fall ESS 311 ESS 330 ESS 347 ESS 370 PHY 130 Speaking Em Spring ESS 331 ESS 331 ESS 343 ESS 405 ESS 420 Ethics Gen E	Environmental Geochemistry Mineralogy Social Science Gen Ed Gen Ed E/CRL 104 RECOMMENDED) Credits Introduction to Astronomy Introduction to Oceanography Earth & Space Science Seminar Introduction to Meteorology General Physics I phasis Gen Ed Credits Introduction to Paleontology Geomorphology Igneous and Metamorphic Petrology Structural Geology	3 3 3 4 16 3 3 17 3 3 3 3 17 3 3 3 3 15

ESS XXX	Upper-Level ESS Elective	3
Arts Gen E	d	3
Speaking En	mphasis Gen Ed	3
	Credits	13
Spring		
ESS XXX	Capstone Course	3
ESS XXX	Upper-Level ESS Elective	3
Elective (GEO 324 RECOMMENDED)		3
Elective (PHY 140 RECOMMENDED)		4
Gen Ed Ele	ective	3
	Credits	16
	Total Credits	125

Accelerated B.S. in Geoscience - Earth Systems Concentration to the M.S. in Geoscience

C	T1	O 11.
Course	Title	Credits
Year One		
Fall ESS 101	Inter-leading to Continue	2
	Introduction to Geology	3
ESS 102 or	Humans and the Environment or The Origin of Life and the Universe	3
SCB 210	of the Origin of Life and the Oniverse	
MAT 115	Algebra, Functions, and Trigonometry	3
or	or Introduction to Statistics I	
MAT 121		
WRT 120	Effective Writing I	3
FYE 100X	First Year Experience	4
	Credits	16
Spring		
ESS 201	Field Geology	3
or ESS 204	or Historical Geology	
ESS 204 MAT 121	Introduction to Statistics I	3
or	or Algebra, Functions, and	3
MAT 115	Trigonometry	
BIO 110	General Biology I	4
WRT 2XX	200-level WRT Course	3
Behavioral &	Social Science Gen Ed	3
	Credits	16
Year Two		
Fall		
ESS 204	Historical Geology	3
or	or Field Geology	
ESS 201		,
CHE 103 & CRL 103	General Chemistry I and General Chemistry I Lab	4
Humanities (•	3
	munities Gen Ed	3
	phasis Gen Ed	3
-18	Credits	16
Spring		
ESS 301	Environmental Geochemistry	3
ESS 302	Mineralogy	3
Behavioral &	Social Science Gen Ed	3
Humanities (Gen Ed	3
Elective (CH	E/CRL 104 RECOMMENDED)	4
	Credits	16

Year Three		
Fall		
ESS 311	Introduction to Astronomy	3
ESS 330	Introduction to Oceanography	3
ESS 347	Earth & Space Science Seminar	1
ESS 370	Introduction to Meteorology	3
PHY 130	General Physics I	4
Speaking Em	phasis Gen Ed	3
	Credits	17
Spring		
ESS 331	Introduction to Paleontology	3
ESS 343	Geomorphology	3
ESS 405	Igneous and Metamorphic Petrology	3
ESS 420	Structural Geology	3
Ethics Gen E	d	3
	Credits	15
Year Four Fall		
ESS 447	Earth and Carro Cairnes Coming	1
ESS 447 ESS 450	Earth and Space Science Seminar	1 3
ESS XXX	Sedimentation & Stratigraphy Graduation Substitution	3
	Graduation Substitution	
Arts Gen Ed	-1 E.1	3
Speaking Em	phasis Gen Ed	3
C	Credits	13
Spring		
ESS XXX	Capstone Course	3
ESS XXX	Graduate Substitution	3
ESS XXX	Graduate Substitution	3
·	O 324 RECOMMENDED)	3
Gen Ed Elect		3
C	Credits	15
Summer	F: 11.C. 1 CC. 1	
ESS 523	Field Geology of Southeastern Pennsylvania	3
ESS 596	Earth Systems Science	3
<u> </u>	Credits	6
Year Five	Cicuits	
Fall		
ESS 521	Geometrics	3
ESS 547	Earth and Space Science Seminar	1
ESS 549	Advanced Hydrogeology	3
or	or Principles of Meteorology	
ESS 570	DI .	
ESS 5XX	Elective	3
a .	Credits	10
Spring	D	
ESS 536	Environmental Geology	3
or ESS 530	or Principles of Oceanography	
ESS 602	Directed Research	3
ESS 5XX	Elective	3
ESS 5XX	Elective	3
100 3/1/1	Credits	12
	Total Credits	152