

MAJOR IN GEOLOGY, ENVIRONMENTAL GEOLOGY CONCENTRATION

Environmental Geology concentration students develop expertise in surface and shallow subsurface processes that shape the Earth and provide critical soil and water resources and services for human society and the natural world. Graduates will be prepared for careers that address environmental implications of geological process and human activities. The curriculum emphasizes the fundamentals of geology, surface and

shallow subsurface processes, field-based research methodologies and technologies, and environmental geosciences. The concentration empowers students to pursue positions with corporations and public, private, and nonprofit organizations that address environmental/natural resource management issues, regulatory agency activities, hazard identification and mitigation, land use, and support research that informs natural resource policy and decision making to advance sound stewardship. The curriculum provides a strong foundation for graduate studies in the many fields of geosciences and environmental science.

Requirements Effective Fall 2024

Freshman

		AUCC	Credits
CHEM 111	General Chemistry I (GT-SC2)	3A	4
CHEM 112	General Chemistry Lab I (GT-SC1)	3A	1
CO 150	College Composition (GT-CO2)	1A	3
GEOL 150 ¹	Dynamic Earth (GT-SC2)	3A	4
GEOL 154	Historical and Analytical Geology		4
GEOL 192	New Student Seminar--Exploring Geosciences		1
MATH 160 ²	Calculus for Physical Scientists I (GT-MA1)	1B	4
TC (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)		1C	3
Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-bahvioral-sciences)		3C	3
Electives			3
Total Credits			30

Sophomore

CHEM 113	General Chemistry II		3
CHEM 114	General Chemistry Lab II		1
GEOL 232	Mineralogy		3
GEOL 344	Stratigraphy and Sedimentology	4A	4
GEOL 364	Igneous and Metamorphic Petrology	4B	4
MATH 161 ³	Calculus for Physical Scientists II (GT-MA1)	1B	4
Select one course from the following:			3
CO 300	Writing Arguments (GT-CO3)	2	
CO 301B	Writing in the Disciplines: Sciences (GT-CO3)	2	
JTC 300	Strategic Writing and Communication (GT-CO3)	2	
Select one course from the following:			5
PH 121	General Physics I (GT-SC1)	3A	
PH 141	Physics for Scientists and Engineers I (GT-SC1)	3A	
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)		3D	3
Total Credits			30

Junior

GEOL 366	Sedimentary Petrology and Geochemistry	4A,4B	4
GEOL 372	Structural Geology	4B	4
GEOL 376	Geologic Field Methods	4A,4C	3
NR 319	Introduction to Geospatial Science		4
SOCR 240	Introductory Soil Science		4
Select one course from the following:			3-5

PH 122	General Physics II (GT-SC1)	3A	
PH 142	Physics for Scientists and Engineers II (GT-SC1)	3A	
SOCR 470	Soil Physics		
Select one course from the following:			3-4
MATH 340	Intro to Ordinary Differential Equations		
STAT 301	Introduction to Applied Statistical Methods		
STAT 315	Intro to Theory and Practice of Statistics		
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			3B 3
Total Credits			28-31
Summer			
GEOL 436	Geology Summer Field Course	4C	6
Total Credits			6
Senior			
GEOL 446	Environmental Geology		3
GEOL 452	Hydrogeology		4
GEOL 454	Geomorphology		4
WR 416	Land Use Hydrology		3
Directed Technical Electives (See list below):			6
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			3B 3
Electives ⁴			0-3
Total Credits			23-26
Program Total Credits:			120

Directed Technical Electives

Code	Title	Credits		
Select a minimum of 6 credits from a minimum of two courses:				
AREC 342	Water Law, Policy, and Institutions	3	GEOL 541	Geostatistics 2
ATS 440/GES 440	Sea Level Rise and a Sustainable Future	3	GEOL 546	Sedimentary Basin Analysis 4
BZ 471 & BZ 472	Stream Biology and Ecology and Stream Biology and Ecology Laboratory	4	GEOL 548	Petroleum Geology 4
CIVE 322	Basic Hydrology	3	GEOL 551	Groundwater Modeling 3
CIVE 440	Nonpoint Source Pollution	3	GEOL 552	Advanced Topics in Hydrogeology 2-3
CIVE 455	Applications in Geotechnical Engineering	3	GEOL 553	Use of Tracers in Hydrogeology 3
CIVE 515	River Mechanics	3	GEOL 554	Remote Sensing of the Earth System 3
CIVE 529	Environmental Organic Chemistry	3	GR 410	Climate Change: Science, Policy, Implications 3
CIVE 538	Aqueous Chemistry	3	MATH 261	Calculus for Physical Scientists III 4
DSCI 335	Inferential Reasoning in Data Analysis	3	MATH 340	Intro to Ordinary Differential Equations 4
ECON 340/AREC 340	Introduction-Economics of Natural Resources	3	MATH 369	Linear Algebra I 3
GEOL 342	Paleontology	3	NR 323/GR 323	Remote Sensing and Image Interpretation 3
GEOL 415	Critical Zone Science	3	NR 400	Public Communication in Natural Resources 3
GEOL 440	Geodetic and Near-Surface Geophysical Methods	4	NR 422	GIS Applications in Natural Resource Management 4
GEOL 442	Applied Geophysics	4	NR 426	Programming for GIS I 2
GEOL 447	Mineral Deposits	3	NR 427	Programming for GIS II 2
GEOL 494A	Independent Study: Environmental/Engineering Geology ⁵	1-18	NR 450	Geospatial Project Design and Analysis 4
GEOL 498	Research ⁵	1-6	NR 453	Geospatial Field Methods in Natural Resources 2
GEOL 540	Petrophysics and Well Log Interpretation	3	NR 503/GR 503	Remote Sensing and Image Analysis 4
			PHIL 565	Seminar in Environmental Philosophy 3
			POLS 361	U.S. Environmental Politics and Policy 3
			SOC 461	Water and Social Justice 3
			SOCR 375	Soil Biogeochemistry 3

SOCR 440	Pedology	4
SOCR 467	Soil and Environmental Chemistry	3
SOCR 470	Soil Physics ⁶	3
STAT 315	Intro to Theory and Practice of Statistics ⁷	3
WR 417	Watershed Measurements	3
WR 418	Land Use and Water Quality	3
WR 419	Water Quality Analyses	3
WR 474	Snow Hydrology	3
WR 524/CIVE 524	Modeling Watershed Hydrology	3

³ Students who substituted MATH 155 for MATH 160 should substitute MATH 255 for MATH 161.

⁴ Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper-division (300- to 400-level).

⁵ A maximum of one credit may be counted toward Directed Technical Electives.

⁶ May be selected as a Directed Technical Elective if not taken in the junior year to fulfill the physics requirement.

⁷ May be selected as a Directed Technical Elective if not taken in the junior year to fulfill the statistics requirement.

¹ GEOL 110, GEOL 120, GEOL 122, or GEOL 124 in combination with GEOL 121 may be substituted for GEOL 150.

² MATH 155 may be substituted for MATH 160.

Major Completion Map

Freshman

Semester 1		Critical	Recommended	AUCC	Credits
CO 150	College Composition (GT-CO2)	X		1A	3
GEOL 150	Dynamic Earth (GT-SC2)	X		3A	4
GEOL 192	New Student Seminar--Exploring Geosciences	X			1
MATH 160	Calculus for Physical Scientists I (GT-MA1)	X		1B	4
Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioural-sciences)			X	3C	3

Total Credits

15

Semester 2		Critical	Recommended	AUCC	Credits
CHEM 111	General Chemistry I (GT-SC2)	X		3A	4
CHEM 112	General Chemistry Lab I (GT-SC1)	X		3A	1
GEOL 154	Historical and Analytical Geology	X			4
1C (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)		X		1C	3
Electives			X		3
CO 150 and MATH 160 must be completed by the end of Semester 2.		X			

Total Credits

15

Sophomore

Semester 3		Critical	Recommended	AUCC	Credits
CHEM 113	General Chemistry II	X			3
CHEM 114	General Chemistry Lab II	X			1
GEOL 232	Mineralogy	X			3
GEOL 344	Stratigraphy and Sedimentology	X		4A	4
MATH 161	Calculus for Physical Scientists II (GT-MA1)	X		1B	4

Total Credits

15

Semester 4		Critical	Recommended	AUCC	Credits
GEOL 364	Igneous and Metamorphic Petrology	X		4B	4
Select one course from the following:		X			3
CO 300	Writing Arguments (GT-CO3)			2	
CO 301B	Writing in the Disciplines: Sciences (GT-CO3)			2	
JTC 300	Strategic Writing and Communication (GT-CO3)			2	
Select one course from the following:		X			5
PH 121	General Physics I (GT-SC1)		X	3A	
PH 141	Physics for Scientists and Engineers I (GT-SC1)		X	3A	
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)			X		3
CHEM 113 must be completed by the end of Semester 4.		X			

Total Credits

15

Junior

Semester 5		Critical	Recommended	AUCC	Credits
GEOL 366	Sedimentary Petrology and Geochemistry	X		4A,4B	4
SOCR 240	Introductory Soil Science	X			4
Select one course from the following:		X			3-5
PH 122	General Physics II (GT-SC1)			3A	
PH 142	Physics for Scientists and Engineers II (GT-SC1)			3A	
SOCR 470	Soil Physics				
Select one course from the following:		X			3-4
MATH 340	Intro to Ordinary Differential Equations				
STAT 301	Introduction to Applied Statistical Methods				
STAT 315	Intro to Theory and Practice of Statistics				
GEOL 344 and PH 121 or 141 must be completed by the end of Semester 5.		X			

Total Credits**14-17**

Semester 6		Critical	Recommended	AUCC	Credits
GEOL 372	Structural Geology	X		4B	4
GEOL 376	Geologic Field Methods	X		4A,4C	3
NR 319	Introduction to Geospatial Science	X			4
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			X	3B	3
MATH 161 and STAT 301 or MATH 340 or STAT 315 must be completed by the end of Semester 6.		X			

Total Credits**14**

Semester 7		Critical	Recommended	AUCC	Credits
GEOL 436	Geology Summer Field Course	X		4C	6

Total Credits**6****Senior**

Semester 8		Critical	Recommended	AUCC	Credits
GEOL 452	Hydrogeology	X			4
WR 416	Land Use Hydrology	X			3
Directed Technical Elective (See Department List on Concentration Requirements tab)		X			3
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			X	3B	3
GEOL 366 must be completed by the end of Semester 8.		X			

Total Credits**13**

Semester 9		Critical	Recommended	AUCC	Credits
GEOL 446	Environmental Geology	X			3
GEOL 454	Geomorphology	X			4
Directed Technical Elective (See Department List on Concentration Requirements tab)		X			3
Electives		X			0-3
The benchmark courses for the 9th semester are the remaining courses in the entire program of study.		X			

Total Credits**10-13****Program Total Credits:****120**