

MAJOR IN GEOLOGY, HYDROGEOLOGY CONCENTRATION

The Hydrogeology concentration provides a rigorous education in surface and subsurface water science, resources and applications, and ensures that students are well prepared for a variety of geosciences

careers. Students will be particularly well prepared for employment in environmental, water resource, geotechnical, and groundwater disciplines, and for public- or private-sector careers managing or assessing water and environmental resources. The concentration provides strong preparation for graduate education in hydrogeology and other water science, environmental, and resource disciplines.

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	Calculus for Physical Scientists I (GT-MA1)	1B	4
1C (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)		1C	3
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	3
Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)		3C	3
Total Credits			30

Sophomore

CHEM 113	General Chemistry II		3
CHEM 114	General Chemistry Lab II		1
Select one 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	
GEOL 232	Mineralogy		3
GEOL 344	Stratigraphy and Sedimentology		4
GEOL 364	Igneous and Metamorphic Petrology	4B	4
MATH 161	Calculus for Physical Scientists II (GT-MA1)	1B	4
PH 141	Physics for Scientists and Engineers I (GT-SC1)	3A	5
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
MATH 261	Calculus for Physical Scientists III		4
Select one course from the following:			3-5
PH 142	Physics for Scientists and Engineers II (GT-SC1)	3A	
SOCR 470	Soil Physics		
STAT 301 or 315	Introduction to Applied Statistical Methods Intro to Theory and Practice of Statistics		3

Arts and Humanities ([http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/](http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities) 3B
#arts-humanities)

3

Total Credits		24-26
Summer		
GEOL 436	Geology Summer Field Course	4C 6
Total Credits		6
Senior		
GEOL 452	Hydrogeology	4
GEOL 454	Geomorphology	4
MATH 340	Intro to Ordinary Differential Equations	4
NR 319	Introduction to Geospatial Science	4
WR 416	Land Use Hydrology	3
Select 6 credits from the Directed Technical Electives list: ²		6
CIVE 322	Basic Hydrology	
CIVE 440	Nonpoint Source Pollution	
CIVE 532	Wells and Pumps	
GEOL 340	Glacial Geology	
GEOL 415	Critical Zone Science	
GEOL 440	Geodetic and Near-Surface Geophysical Methods	
GEOL 442	Applied Geophysics	
GEOL 446	Environmental Geology	
GEOL 447	Mineral Deposits	
GEOL 494A ³	Independent Study: Environmental/Engineering Geology	
GEOL 498 ³	Research	
GEOL 540	Petrophysics and Well Log Interpretation	
GEOL 541	Geostatistics	
GEOL 546	Sedimentary Basin Analysis	
GEOL 548	Petroleum Geology	
GEOL 551	Groundwater Modeling	
GEOL 552	Advanced Topics in Hydrogeology	
GEOL 553	Use of Tracers in Hydrogeology	
GEOL 579	Solid Earth Inverse Methods and Practices	
MATH 332	Partial Differential Equations	
MATH 369	Linear Algebra I	
MATH 450	Introduction to Numerical Analysis I	
SOGR 470 ⁴	Soil Physics	
WR 417	Watershed Measurements	
WR 418	Land Use and Water Quality	
WR 419	Water Quality Analyses	
Electives ⁵		3-5
Total Credits		28-30
Program Total Credits:		120

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

² At least one of the selected courses must be a geology course.

³ Only one credit may be used to fulfill the Directed Technical Elective requirement.

⁴ May be selected as a Directed Technical Elective if not taken in the junior year to fulfill the physics requirement.

⁵ Select enough credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper-division (300- 400-level).

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
Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)			X	3C	3
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humaitiies)				3B	3

Total Credits **14**

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
MATH 160	Calculus for Physical Scientists I (GT-MA1)	X		1B	4
1C (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)		X		1C	3
CO 150 must be completed by the end of Semester 2.		X			

Total Credits **16**

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
PH 141	Physics for Scientists and Engineers I (GT-SC1)	X		3A	5
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	
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)			X	3D	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
MATH 261	Calculus for Physical Scientists III	X			4
Select one course from the following:		X			3-5
PH 142	Physics for Scientists and Engineers II (GT-SC1)			3A	
SOCR 470	Soil Physics				
GEOL 344 must be completed by the end of Semester 5.		X			

Total Credits **11-13**

Semester 6		Critical	Recommended	AUCC	Credits
GEOL 372	Structural Geology	X		4B	4
GEOL 376	Geologic Field Methods	X		4A,4C	3
Select one course from the following:		X			3

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)			X	3B	3
Total Credits					13
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
MATH 340	Intro to Ordinary Differential Equations	X			4
NR 319	Introduction to Geospatial Science	X			4
WR 416	Land Use Hydrology	X			3
GEOL 366 must be completed by the end of Semester 8.		X			
Total Credits					15
Semester 9		Critical	Recommended	AUCC	Credits
GEOL 454	Geomorphology	X			4
Directed Technical Electives (See Department List on Concentration Requirements tab)		X			6
Electives		X			3-5
The benchmark courses for the 9th semester are the remaining courses in the entire program of study.		X			
Total Credits					13-15
Program Total Credits:					120