

BACHELOR OF SCIENCE IN EARTH SCIENCES: HYDROLOGY EMPHASIS – GEOL ASSOCIATE DEGREE FOR TRANSFER ROADMAP

This is a sample pathway for students who transfer to San Francisco State University in the current Bulletin year with an AS-T in Geology. Twenty-six units in the major (CHEM 115/CHEM 215/CHEM 216, EARTH 210, EARTH 500, EARTH 505, MATH 226, 2 elective units) and all lower-division GE requirements have been satisfied. Additional units in the major may have been satisfied. Check with a major advisor about the most appropriate course sequence. **Degree completion guaranteed in 60 units**; see the Associate Degree for Transfer (ADT) section for more information.

Course	Title	Units
First Semester		
ERTH 400	Earth Systems I (Major Core)	3
ERTH 425	Geomorphology (Major Emphasis)	4
Select One Set of Courses (Science and Math Foundation): ¹		4
PHYS 111 & PHYS 112	General Physics I and General Physics I Laboratory (B1, B3)	
PHYS 220 & PHYS 222	General Physics with Calculus I and General Physics with Calculus I Laboratory (B1, B3) ²	
MATH 227	Calculus II (if selecting PHYS 220/PHYS 222) ²	4
or University Elective if selecting PHYS 111/PHYS 112		
	Units	15
Second Semester		
ERTH 205	Techniques in Earth Sciences (Major Core)	2
ERTH 600GW	Earth's Climate History - GWAR (Major Core)	3
Select One Set of Courses (Science and Math Foundation): ¹		4
PHYS 121 & PHYS 122	General Physics II and General Physics II Laboratory	
PHYS 240 & PHYS 242	General Physics with Calculus III and General Physics with Calculus III Laboratory	
Hydrology Emphasis Elective (5 units) - Take One ³		3
GE Area UD-C: Upper-Division Arts and/or Humanities		3
	Units	15
Third Semester		
ERTH 430	Fluid Dynamics in Earth Systems (Major Emphasis)	3
ERTH 442/GEOG 342	Surface Water Hydrology (Major Emphasis)	4
ERTH 444	Hydrogeology (Major Emphasis)	4
ERTH 697	Undergraduate Research (Major Culminating Experience) ⁴	2
or University Elective		
Hydrology Emphasis Elective (5 units) - Take One ³		2
	Units	15
Fourth Semester		
ERTH 544	Groundwater Contamination (Major Emphasis)	3

ERTH 690	Earth Sciences Capstone Presentation (Major Culminating Experience)	1
Major Culminating Experience - Select One: ⁴		2-4
ERTH 695	Senior Project	
ERTH 698	Senior Thesis	
Field Geology ⁵		
GE Area UD-B: Upper-Division Physical and/or Life Sciences ⁶		3
GE Area UD-D: Upper-Division Social Sciences		3
U.S. and California Government		3
or University Elective if US/CA Government met before transfer		
		Units
		15-17
		Total Units
		60-62

¹ PHYS 111/PHYS 112 are prerequisites for PHYS 121/PHYS 122. PHYS 220/PHYS 222 are prerequisites for PHYS 240/PHYS 242.
² MATH 227 is a hidden corequisite for PHYS 220/PHYS 222.

³ **Hydrology Emphasis Electives (5 units)**

Select additional Hydrology emphasis electives upon advisement, subject to the following constraints:

- Emphasis requirements above plus electives must total at least 34 units.
- Electives may be selected from among the following options:
 - Any EARTH course numbered 200 or higher
 - Up to three of any of the following, non-ERTH courses:
 - GEOG 312, GEOG 313, GEOG 314, GEOG 316, GEOG 317, GEOG 500GW, GEOG 427, GEOG 430, GEOG 602, GEOG 603, GEOG 606, GEOG 610, GEOG 611, GEOG 620, GEOG 621, GEOG 625, GEOG 629, GEOG 643, GEOG 644, or GEOG 647
 - ENGR 103, or any MATH, PHYS, CHEM, ENGR, CSC, or BIOL course numbered 200 or higher
 - One non-GE course not listed above, with the approval of a Department of Earth & Climate Sciences advisor and the Department Chair.

When choosing electives, keep in mind that SF State requires all students to complete at least 40 units of upper-division coursework to graduate.

⁴ Take EARTH 697 if selecting Honors Thesis as the Major Culminating Experience. Take University Elective if selecting *either* EARTH 695 - Senior Project *or* Field Geology as the Major Culminating Experience.

⁵ Four unit Field Geology option typically takes place during the summer following the 4th semester.

⁶ Consult with a department advisor about selection of EARTH course for UD-B.

To do at SF State:

Enough total units to reach 120 minimum for graduation; 40 units minimum at the upper-division level; to include the following:

University-Wide Requirements: 9-15 units

- American Institutions (0-6 units): US History, US Government, California State and Local Government requirements if not taken before transfer.
- Upper-Division GE, Areas B, C, and D (9 units): Courses required for the major may double-count if approved for UD GE.
- Students transferring with the AS-T in Geology are not required to fulfill SF State Studies or Complementary Studies requirements.

Earth Sciences Major (Emphasis in Hydrology): 42-43 units

[CHEM 115, MATH 226, EARTH 210, EARTH 500, EARTH 505, and 7 units of Geology emphasis electives, 5 units of CHEM 215/CHEM 216, 1 unit of 4 units of Historical Geology, and 1 unit of 4 units of Calculus II in the Geology AS-T met in transfer.

- Basic Science & Math Foundation (8 units in PHYS): If some or all PHYS completed before transfer, consult with a major advisor about appropriate course choices.
- Earth Sciences Core/GWAR (8 units): Three of the 4 units of Historical Geology in the AS-T substitute for EARTH 500, and 3 of the 4 units of Calculus II in the Geology AS-T substitute for EARTH 505.
- Hydrology Emphasis (17 units)
- Electives (5 units): Five units of CHEM 215/CHEM 216, 1 unit of 4 units of Historical Geology, and 1 unit of Calculus II in the Geology AS-T satisfy 7 units of the 12 unit elective requirement; if taken before transfer, Mineralogy satisfies 4 units of the elective requirement. If Mineralogy completed before transfer, consult with a major advisor about appropriate course choices.
- Culminating Experience (4-5 units): Take EARTH 690 (1 unit) along with one of the following three options: Senior Honors Thesis (ERTH 697/ERTH 698 (2 units each); Senior Project (ERTH 695, 3 units); or Field Geology course (4 units) offered as a summer field camp, typically the summer following the 4th semester.

University Electives: 3 or more units

Depends on course choices made at the community college, how transferred units are applied to the requirements above, Culminating Experience option selected, and course choices at SF State. Some courses may meet more than one requirement, e.g. both in UD GE and in the major.