

# GEOLOGY

## DEPARTMENT OFFICE

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## DEPARTMENT CHAIR

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## Faculty

Matthew J. James  
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## Programs Offered

Bachelor of Science in Geology  
Bachelor of Arts in Earth Sciences  
Minor in Geology  
Minor in Paleontology  
Secondary Education Teaching Credential Preparation

Geology is the study of the materials, structures, processes, and history of the earth. Philosophically, it allows us to realize our place in the physical universe within the enormity of geologic time. Practically, it leads to understanding of earth processes, the formation of rocks and minerals, and the energy supplies and materials that support our civilization.

The evolution of modern geologic thought is based on field studies and empiricism. A solid foundation in quantitative field and laboratory analysis provides a firm background in the principles of geology. Students take a fundamental curriculum that concentrates on the analysis of rocks and minerals, geologic mapping, and report writing. Required courses in physics, chemistry, and mathematics support understanding of geologic principles.

## Careers in Geology and Earth Sciences

Within the general field of geology, students may choose from major programs that lead to either a B.S. in Geology or a B.A. in Earth Science. The B.S. in Geology provides an excellent background for graduate school and for work in geology in such fields as engineering geology, environmental geology, hydrology, and mineral exploration. Many of our geology graduates work for consulting firms with

specialties in one or more of these areas. The B.A. in Earth Science provides our students with the background to become teachers, environmental consultants, to work in the energy industry or in governmental positions. Because of the selectivity involved in choosing a program that meets their own particular interests and goals, students must consult with a departmental advisor about their plan of study and their course load each semester.

## Bachelor of Science in Geology

This plan is intended to give the student basic professional competence in geology. A calculus-based series of support courses is highly recommended for students intending to pursue a more quantitative geoscience career. It provides an excellent foundation for graduate school or a professional career in the geosciences such as a Professional Geologist, Hydrologist, or Geophysicist registered with the State of California.

Degree Requirements	Units
General education	42*
Major requirements	50
Supporting courses	22-24
General electives	4-6
<b>Total units needed for graduation</b>	<b>120</b>

### Major Core Requirements

GEOL 205/205a Mineralogy	4/1
GEOL 303 Advanced Principles of Geology	4*
GEOL 304 Geologic Mapping and Report Writing	1
GEOL 307 Igneous and Metamorphic Petrology	4
GEOL 308 Igneous and Metamorphic Field	1
GEOL 309 Computer Application in Geology	4
GEOL 311 Sedimentary Geology	4
GEOL 312 Sedimentary Geology Field	1
GEOL 313 Paleontology	4
GEOL 314 Paleontology Field	1
GEOL 317 Structural Geology	4
GEOL 318 Structural Geology Field	1
GEOL 420 Integrative Field Experience	4
GEOL 427 Advanced Field Geology	4
<b>Total units in the major core</b>	<b>41</b>

### Major Electives

Choose 9 units of upper-division geology electives in consultation with a departmental advisor.

**Total units in major electives** 9

### Required Supporting Courses

CHEM 115AB General Chemistry	10
PHYS 114 Introduction to Physics I or PHYS 210A General Physics	3/4

PHYS 116 Introductory Laboratory or PHYS 209A General Physics Laboratory	1
PHYS 214 Introduction to Physics II † or PHYS 210B General Physics †	3/4
PHYS 216 Introductory Laboratory † or PHYS 209B General Physics Laboratory †	1
MATH 161 Calculus I with Analytic Geometry	4*

Total units in supporting courses 22/24

Total units in the major 72/80

\* The standard 51 units of GE are reduced by 3 units each from GEOL 102, GEOL 303, and MATH 161, which are major requirements. These three classes satisfy requirements in GE categories B1, B3, and B4, respectively.

† GEOL 310 may be substituted.

## Sample Four-year Plan for Bachelor of Science in Geology

### FRESHMAN YEAR:: 29 Units

Fall Semester (14 Units)	Spring Semester (15 Units)
GEOL 102 (3)	MATH 161 (4)
CHEM 115A (5)	CHEM 115B (5)
GE (6)	GE (6)

### SOPHOMORE YEAR:: 28 Units

Fall Semester (15 Units)	Spring Semester (13 Units)
GEOL 303 (4)	GEOL 313 (4)
GEOL 304 (1)	GEOL 314 (1)
GEOL 205 (4)	GEOL 311 (4)
GEOL 309 (4)	GEOL 312 (1)
GE (2)	GE (3)

### JUNIOR YEAR:: 29 Units

Fall Semester (14 Units)	Spring Semester (15 Units)
PHYS 114 (4)	GEOL 307 (4)
PHYS 116 (1)	GEOL 308 (1)
GEOL 317 (4)	GEOL 310 (4)
GEOL 318 (1)	GEOL 323 (3)
GE (4)	GE (3)

### SENIOR YEAR:: 30 Units

Fall Semester (15 Units)	Spring Semester (15 Units)
GE (12)	GEOL 420 (4)
Geology Elective (3)	Geology Elective (3)
	GE (8)

### SENIOR SUMMER:: 4 Units

GEOL 427 (4) [Summer Field Camp]

TOTAL SEMESTER UNITS:: 120

## Bachelor of Arts in Earth Sciences

At the printing of this catalog, the B.A. in Earth Sciences has not completed the full approval process. The Geology Department hopes/plans to have the B.A. in Earth Sciences completely approved by the start of the Fall semester, 2011. Please see the department web page for updates on the B.A. in Earth Sciences.

### Minor in Geology

Completion of a minimum of 20 units from Geology Department courses will constitute a minor in geology. Six of the 20 units must be upper-division. Students should consult with an advisor in the Geology Department regarding required courses.

### Minor in Paleontology

#### PROGRAM COORDINATOR

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#### ADVISORS

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### Minor in Paleontology

The Minor in Paleontology offers students from any major on the SSU campus a cross-disciplinary concentration in the study of ancient life on Earth. Paleontology is by its very nature an interdisciplinary field of study, blending both laboratory and field studies of modern organisms and extinct organisms. Some paleontologists approach the field from a geological perspective, and others approach it from a biological perspective. For a Minor in Paleontology, students must complete 20 units as described below.

#### Minor Core Requirements

	Units
GEOL 102 Our Dynamic Earth	3
GEOL 313 Paleontology	4
BIOL121 Diversity, Structure, and Function, or BIOL 122 Genetics, Evolution, and Ecology	4

Total units in the minor core 11

#### Minor Electives

In addition to the Minor Core, choose 9 units of electives from other paleontology courses and/or courses with an emphasis on

interpreting the history of life on Earth, and at least 1 unit that is a field course (marked by asterisk below). All SSU majors may select the Minor in Paleontology, and if you are majoring in either Biology or Geology, at least 3 upper division elective units must be from outside your home department. Additional courses may be counted toward the minor with approval of one of the minor advisors above. The 9 elective units must include at least one 4-unit upper division course with a laboratory from the following list:

ANTH 301 Human Fossils and Evolution	4
ANTH 326 Bioarchaeology [Topics in Archaeology]	4
ANTH 412 Human Osteology	4
†ANTH 415 Forensic Anthropology	4
†BIOL 220 Human Anatomy	4
†BIOL 322 Invertebrate Biology	4
†BIOL 327 Vertebrate Biology	4
†BIOL 328 Vertebrate Evolution and Morphology	4
BIOL 385 Biology of the Dinosaurs	3
GEOG 370 Weather and Climate	4
GEOG 372 Climate Change	4
GEOL 105 The Age of Dinosaurs	3
GEOL 120 Regional Field Geology	3
GEOL 302 Geology of Climate Change	3
†GEOL 303 Advanced Principles of Geology	4
*GEOL 304 Geologic Mapping and Report Writing	1
*GEOL 314 Paleontology Field Course	1
*GEOL 321 Burgess Shale Paleontology	3
†GEOL 326 Stratigraphy and Earth History	4
<b>Total elective units in the minor</b>	<b>9</b>

\* Field courses – one course is required for the minor

† 4-unit laboratory courses – one course is required for the minor

Some of these elective courses above might have additional prerequisites not listed here. Refer to the University catalog for additional information.

**Total units for the paleontology minor 20**

## **Secondary Education Teaching Credential Preparation**

Geology and Earth Science students must demonstrate competence in the natural sciences by passing the subject matter examination required by the California Commission on Teacher Credentialing (CCTC). One part of the examination will test breadth of knowledge in biology, chemistry, physics, astronomy, and geology. Another part of the examination will test depth of knowledge in a particular area, such as geology. The B.S. in Geology or the B.A. in Earth Science degrees are recommended to prepare for the part of the examination that tests depth of knowledge in geology. For recommended course selection to help prepare for the part of the examination that tests breadth of scientific knowledge, please see the Teaching Credential section of the SSU catalog. GEOL 107, Introduction to Earth Science, is specifically designed for students who are preparing to take the CCTC single-subject exam.

For more information, please contact the Department of Geology, (707) 664-2334.

### **Department Policy for Senior Theses (GEOL 426A/426B)**

1. The student must have a 3.00 or higher departmental grade point average.
2. The student must have demonstrated ability to work independently and do quality work in both the lecture and field classes.
3. The student must have time in his/her schedule to complete two semesters of research (three credit hours each) and register for both 426A (in the Fall) and 426B (in the Spring).
4. The student must submit a detailed proposal of research, a schedule, a budget and an initial hypothesis.
5. The student must have a faculty sponsor who is willing to advise the project and will set up a schedule of meetings for this purpose.
6. Two copies of the final paper/report will be filed with the department office before a grade will be assigned.
7. The student will present the results of her/his project at the department colloquium.