California State University
Northridge

*Last updated: 8/4/09*

**Bachelor of Science in**

# Geology, Option IV: Geophysics

For information call

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Cal State Northridge
18111 Nordhoff St.
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**Academic Advisement:**
Undergraduate and graduate geology majors must be advised each semester before registering for classes. Undergraduate geology majors see Dr. Sloan and graduate majors see Dr. Marsaglia. Undergraduate and graduate majors in Geophysics see Dr. Simila.

**THE MAJOR:** Geology is a multidisciplinary science that applies the concepts of biology, chemistry, physics, mathematics, and engineering to the natural world around us. The rich variety of its fields of study includes oceanography, paleontology, geophysics, geochemistry, hydrogeology, engineering geology, and more. That is what makes geology an exciting and challenging major for students with broad scientific interests and a love of our planet's natural systems, environment, and history.

Geology majors gain basic scientific observational, reasoning, and communication skills and an understanding of geological concepts and history. This blend of interpretive scientific ability and historical perspective gives geologists an important role in society. They apply their skills and knowledge to solve complex problems related to human interaction with natural systems, hazards, and resources and to communicate solutions and options to the public.

**CAREERS:** A wide variety of job opportunities in both private industry and government service are available to geology graduates. Graduates with Bachelor's degrees will normally begin their work career at entry level positions, whereas graduates with Master's degrees will start at positions with greater responsibility and have greater opportunities for long-term career advancement. Examples of opportunities in private industry include engineering geology (evaluating sites for homes, commercial buildings, highways, etc.), environmental geology (environmental impact studies, evaluation and remediation of contaminated sites), hydrogeology (development and quality control of ground water resources), and the discovery and extraction of earth resources such as oil, gas, coal, and metallic and non-metallic resources.

Agencies in all levels of government--city, county, state, and federal--employ geologists for regulatory and oversight (inspection and monitoring) activities. Additionally, a degree in geology is excellent background for preparing to teach physical science and earth science at the secondary school level and--for those with an M.S. degree--at the community college level.

Finally, the B.S. degree serves as excellent preparation for entry to graduate programs, either at Cal State Northridge or at other universities.

**STUDENT LEARNING OUTCOMES OF THE UNDERGRADUATE AND GRADUATE PROGRAM:**
Undergraduate majors will receive instruction of sufficient breadth, depth, and currency to prepare them for successful appointment to entry-level professional work or graduate school. At the time of graduation, they will have learned (1) background knowledge of earth materials, processes, and history; (2) skills in standard data-gathering and data-analysis methods in both lab and field settings; (3) how to identify geologic problems and develop testable hypotheses that would aid in their solution in both independent and collaborative modes; and (4) how to present polished summaries, both written and oral, of their geological discoveries.

Graduates of the Master of Science program will have received training and experience sufficient to prepare them for professional positions in the geological sciences that require a broad background knowledge of the geological sciences, substantial experience in gathering and interpreting geologic data, and skill at communicating their knowledge in a confident and competent manner. Such graduates will be well prepared to enter Ph.D. programs at other universities and to assume responsible positions (1) in industry or in government agencies; and (2) as instructors in secondary school and community college classrooms.

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**OPTION IV: GEOPHYSICS**

**LOWER-DIVISION REQUIRED COURSES (55 UNITS)**.

| | | |
|---|---|---|
| GEOL | 101/102 | Geology of Planet Earth and Lab (3/1) |
| or | | |
| GEOL | 110/112 | Earth and Life through Time and Lab (3/1) |
| GEOL | 207/L | Mineralogy and Lab (3/1) |
| GEOL | 235 | Introduction to Field Methods (2) |
| COMP | 110/L | Introduction to Algorithms and Programming and Lab (3/1) |
| MATH | 150A | Calculus I (5) |
| MATH | 150B | Calculus II (5) |
| MATH | 250 | Calculus III (3) |
| MATH | 280 | Applied Differential Equations (3) |
| CHEM | 101/L | General Chemistry I and Lab (4/1) |
| CHEM | 102/L | General Chemistry II and Lab (4/1) |
| PHYS | 225/220AL | Physics I and Mechanics Lab (4/1) |
| PHYS | 226/220BL | Physics II and Electricity and Magnetism Lab (4/1) |
| PHYS | 227/L | Physics III and Lab (4/1) |

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**UPPER-DIVISION REQUIRED COURSES (20 UNITS)**

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|---|---|---|
| GEOL | 307/L | Petrology and Lab (3/1) |
| GEOL | 310/L | Structural Geology and Lab (3/1) |
| GEOL | 343/L | Principles of Stratigraphy and Lab (3/1) |
| GEOL | 460 | Theoretical Geophysics (3) |
| GEOL | 464/L | Applied Geophysics and Lab (3/1) |
| GEOL | 497 | Research Methods and Design (1) |

**ELECTIVES (9 UNITS)**

These should be selected from any upper-division geology courses exclusive of 300, 301. Other electives might qualify, but require approval of the departmental undergraduate advisor.

**TOTAL UNITS IN THE MAJOR, OPTION I: 84**

**GENERAL EDUCATION (33 UNITS)**

Basic Skills Mathematics, the entire section of Natural Sciences, and Lifelong Learning are met by required courses in the major.

**ADDITIONAL UNITS: 3**

**TOTAL UNITS REQUIRED FOR THE B.S. DEGREE, OPTION IV: 120**