EARTH AND PLANETARY SCIENCES

Program Description
Earth and Planetary Sciences is the department for explorers! Their discoveries are worlds away and also next door. They study mountains and plains, oceans and atmosphere, the history of the earth and the life it supports, and the origins of the universe.

At Santa Barbara City College, Earth and Planetary Sciences students can choose from a wide variety of courses, including Geology, Geography, Oceanography, Meteorology, Astronomy and Geographic Information Systems (GIS). All are designed to prepare them for exciting and rewarding careers.

The Astronomy Major
Astronomy has played an important role in the development of modern science and technology. Astronomers study the formation, chemistry, composition, and evolution of celestial objects. Modern astronomers work with advanced technology and instrumentation to study planets, stars, galaxies, nebulae, black holes, and the universe itself. Students take astronomy courses to prepare for a major in astronomy, or to fulfill general education requirements in related fields, or to prepare for various vocational jobs as technicians for high-tech industries. Graduates with a bachelor's degree in astronomy pursue careers as museum and planetarium directors, astronomers/astrophysicists, space scientists, mission data analysts, spacecraft and instrument designers, teachers, observatory technicians, telescope operators, electronics technicians, computer programmers, or to work in the fields of optics, mathematics, electronics, or computer programming.

For more information on the Astronomy program visit http://www.sbcc.edu/earthscience/astronomy.php

The Geography Major
Geography is the science of space and place. Geographers study spatial distributions and relations within Earth’s human-environment systems, incorporating historic and contemporary human activities within the context of the biophysical and cultural environments, and the emergence of humanity as one of the major agents of change on Earth. The geography program exposes students to many of the tools and technologies employed by earth science professionals, including Geographic Information Systems (GIS) and Global Positioning Systems (GPS). The Associate in Arts Degree in Geography provides for a liberal education and prepares one for positions in business, government, environmental consulting, resource management, teaching, the technology sector, and service in foreign areas.

For more information on the Geography program visit http://www.sbcc.edu/earthscience/astronomy.php

The Geology Major
Geology is a multi-disciplinary science that applies 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, environmental geology and more. That is what makes geology an exciting and challenging major for students with broad scientific interests and a love for natural systems, environments and our planet's history.

Geology majors gain scientific observational reasoning, 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.

Geology majors who earn their Geology Associate in Arts Degree from Santa Barbara City College are thoroughly prepared to transfer to and excel in university-level geology programs throughout the state and the nation.

Career Opportunities
Many job opportunities are available to geology graduates. Most opportunities are in private industry—in engineering geology (evaluating sites for homes, commercial buildings, highways, tunnels, etc.); environmental geology (environmental impact studies, evaluation and remediation of contaminated sites); and hydrogeology (development and quality control of groundwater resources).

Geologists are also employed in the discovery and extraction of earth resources, such as energy resources, and metallic and nonmetallic elements.

Besides private industry, all levels of government—city, county, state and federal—employ geologists for planning and regulatory (inspection and monitoring) activities.

A degree in geology is excellent background for academic research and for teaching physical science at the secondary school level.

Planning a Program of Study
Careers in the earth and planetary sciences are increasingly dependent upon completion of one year of calculus, college chemistry and college physics, along with a sound foundation in the earth sciences. The student is therefore urged to plan a program to ensure the orderly completion of the required courses outside the earth sciences. Students having deficiencies, particularly in mathematics, should correct these deficiencies early in their programs.

Not all courses in the Department of Earth and Planetary Sciences are offered each semester. Courses currently offered only during the Fall Semester are ERTH 125 Mineralogy and Resources, ERTH 114 The Geology Of California, ERTH 121 Geology Seminar, and ERTH 131 Geologic Field Studies - Eastern Sierra Nevada.

Courses currently offered only during the Spring Semester are ERTH 126 Petrology and Rock-Forming Minerals, ERTH 113 Geology of National Parks, ERTH 132 Geologic Field Studies - Death Valley, and ERTH 133 Introductory Geologic Field Seminar - Colorado Plateau.

Preparation for Transfer
Course requirements for transfer vary depending upon the college or university a student wishes to attend. Therefore, it is most important for a student to consult a departmental adviser before planning an academic program for transfer.
Honors and Awards
During the latter part of each Spring Semester, an awards event is held to recognize students for their academic achievements and service to the department and college. Many awards are given.

Scholarships
Various organizations provide scholarships for students in the Earth and Planetary Sciences. These scholarships may be awarded for academic excellence and/or financial need. A partial list of these scholarships:

- Petrolog, Inc. Scholarship
- Thomas Bennett Scholarship
- Harold Alexander Scholarship
- Karen Armstrong Scholarship
- Ronald Chromy Scholarship
- Carl Sagan Scholarship
- Ventura Gem and Mineral Society Award
- William Kennett Geology Scholarship
- Jeff Marshall Mineralogy Award
- Soil Moisture Award
- Coast Geological Society Scholarship
- Phil Olsen Award
- American Petroleum Institute Scholarships
- Dr. Robert S. Gray Award, Outstanding Geological Sciences Major

Tutorial Opportunities
Each semester, qualified advanced Earth Science students are selected to tutor beginning Earth Science students. This program has direct benefits for both the beginning student and the tutor. The Earth Science tutorial program provides one-on-one instruction and is free.

Special Department Resources
The Earth and Planetary Sciences Department has one of the most completely equipped facilities of any two-year college in the state. This includes research-quality petrographic microscopes, a complete rock processing and thin section laboratory, a complete stock of mineral, rock and fossil material, geophysical instruments, a number of field vehicles, field survey instruments, GPS units, advanced astronomy telescopes and a planetarium, and other specialized earth science equipment. This equipment offers students unparalleled opportunities for “hands-on” instruction.

Advising
In addition to the college counselor for Earth and Planetary Sciences and the Career Center staff, the department faculty is available to students who are planning academic programs and career goals in the earth sciences. For further information on programs or courses of study at Santa Barbara City College, contact Bill Dinklage (EBS-111, (805) 730-4114) or Stephanie Mendes (EBS-117, (805) 965-0581 x4113).

Student Participation
Students have many opportunities to become involved in department-related activities through the Geology Club, which sponsors numerous field trips, outings, and social events throughout the school year. We also have a Student Chapter of the American Association of Petroleum Geologists (AAPG). Please talk with our staff and faculty if you are interested in either of these clubs.

Programs of Study
- Geography, Associate in Arts for Transfer (AA-T) (https://catalog.sbcc.edu/academic-departments/geography/geography-aat/#requirements)
- Geology, Associate in Science for Transfer (AS-T) (https://catalog.sbcc.edu/academic-departments/earth-planetary-sciences/geology-ast)
- Astronomy, Associate in Science (AS) (https://catalog.sbcc.edu/academic-departments/earth-planetary-sciences/astronomy-as)
- Environmental Studies, Associate in Arts (AA) (https://catalog.sbcc.edu/academic-departments/environmental-studies/environmental-studies-aa)
- Geography, Associate in Arts (AA) (https://catalog.sbcc.edu/academic-departments/geography/geography-aa)
- Geological Sciences, Associate in Science (AS) (https://catalog.sbcc.edu/academic-departments/earth-planetary-sciences/geological-sciences-as)

Credit Courses
Earth Studies and Planetary Sciences (ERTH)

ERTH 101 Introductory Astronomy (3 Units)
Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 001 or MATH 041.
Hours: 54 (54 lecture)
Non-mathematical presentation of knowledge of the universe. Includes birth and death of stars, formation of the solar system, black holes, quasars, the fourth dimension, and the fate of the universe. Also considered are common phenomena such as eclipses, the motion of the planets and their moons, comets, and meteors.
SBCC General Education: SBCCGE Area A Lecture Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 101 and ERTH 101H combined: Maximum credit, one course.

ERTH 101H Introductory Astronomy, Honors (4 Units)
Limitations on Enrollment: Admission to Program.
Course Advisories: ERTH 102.
Skills Advisories: Eligibility for ENG 110 or 110H and proficiency in MATH 1 or MATH 41
Hours: 72 (72 lecture)
Introduces students to the universe throughout its history. It emphasizes astronomical knowledge from Earth, as a planet in the solar system, to quasars at the edge of the known universe. The motions of objects within the galaxy are also examined.
SBCC General Education: SBCCGE Area A Lecture Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 101 and ERTH 101H combined: Maximum credit, one course.
ERTH 102 Observational Astronomy Laboratory (1 Unit)
Corequisites: ERTH 101 or 101H.
Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 1 or MATH 41.
Hours: 54 (54 lab)
Emphasizes night-time observation of the stars, galaxies and constellations with real-time observations. Simulation programs are used to graphically examine astronomical phenomena. Celestial navigation, motions of the earth and moon, and study of the celestial sphere emphasized.
SBCC General Education: SBCCGE Area A Lab
Transfer Information: CSUGE Area B3, IGETC Area 5C, CSU Transferable, UC Transferable

ERTH 103A Adv Observational Astronomy Lab - FALL (1 Unit)
Prerequisites: ERTH 102.
Hours: 54 (54 lab)
Follow-up course to ERTH-102. Use of planetarium and observatory to illustrate constellations, celestial motions, and to observe stars, planets, and deep sky objects. Emphasis for continuing students is on stars & constellations of the FALL sky, use of larger and more advanced telescopes, and in-depth observations of deep sky objects of the FALL sky.
Transfer Information: CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 103A, 103B, 103C combined: Maximum credit, one course.

ERTH 103B Adv Observational Astronomy Lab - SPRING (1 Unit)
Prerequisites: ERTH 102.
Hours: 54 (54 lab)
Follow-up course to ERTH-102. Use of planetarium and observatory to illustrate constellations, celestial motions, and to observe stars, planets, and deep sky objects. Emphasis for continuing students is on stars & constellations of the SPRING sky, use of larger and more advanced telescopes, and in-depth observations of deep sky objects of the SPRING sky.
Transfer Information: CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 103A, 103B, 103C combined: Maximum credit, one course.

ERTH 103C Adv Observational Astronomy Lab - SUMMER (1 Unit)
Prerequisites: ERTH 102.
Hours: 54 (54 lab)
Follow-up course to ERTH-102. Use of planetarium and observatory to illustrate constellations, celestial motions, and to observe stars, planets, and deep sky objects. Emphasis for continuing students is on stars & constellations of the SUMMER sky, use of larger and more advanced telescopes, and in-depth observations of deep sky objects of the SUMMER sky.
Transfer Information: CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 103A, 103B, 103C combined: Maximum credit, one course.

ERTH 104 Introductory Astrophysics (3 Units)
Skills Advisories: Eligibility for ENG 103.
Hours: 54 (54 lecture)
Proficiency in MATH 104 or 107 or 111. Introductory astronomy course that integrates mathematics of physics in the study of objects in the universe.
Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable

ERTH 105A Planetary Geology of Recent NASA Missions (1 Unit)
Hours: 18 (18 lecture)
Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 1 or MATH 41. Designed for students wanting to go beyond the regular introductory astronomy courses. Lectures, discussions, guest speakers, activities and field trips help students explore specific topics in physics and astronomy. This semester’s topic is on recent discoveries from planetary space flight missions to Mercury, Mars, Saturn, Saturn’s moon titan and comets.
Transfer Information: CSU Transferable

ERTH 106 Black Holes and the Universe (3 Units)
Course Advisories: ERTH 101 or 101H.
Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 1 or MATH 41.
Hours: 54 (54 lecture)
Basic introduction to relativity, cosmology, quantum mechanics, string theory, black holes, time travel, higher dimensions and other abstract theories of the universe. Provides students with a broad-based overview of these physics theories and allows them to explore various current topics in astronomy.
Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable

ERTH 111 Dynamic Earth - Physical Geology (3 Units)
Course Advisories: ERTH 111L and 131 or 132.
Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 1 or MATH 41.
Hours: 54 (54 lecture)
Introduction to the physical development of the earth. Emphasis on earth materials (rocks and minerals), hydrologic processes, tectonic process (plate tectonics, earthquakes, mountain building and volcanism), and structures (folds, faults). Current theories on structure and evolution of the earth are discussed. Designed for both non-science majors and earth science majors. Required of all Geology majors.
SBCC General Education: SBCCGE Area A Lecture
Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 111 and 111H combined: maximum credit, one course.
C-ID: GEOL 100.

ERTH 111H Dynamic Earth - Physical Geology, Honors (4 Units)
Limitations on Enrollment: Acceptance into the Honors Program.
Course Advisories: ERTH 111L or ERTH 131.
Skills Advisories: Eligibility for ENG 110 or ENG 110H and proficiency in MATH 1 or MATH 41.
Hours: 72 (72 lecture)
Introduction to the physical development of the earth. Emphasis on earth materials (rocks and minerals), hydrologic processes (weathering, streams, glaciers, beaches and ground water), tectonic processes (plate tectonics, earthquakes, mountain building and volcanism), and structures (folds, faults). Current theories on structure and evolution of the earth are discussed.
SBCC General Education: SBCCGE Area A Lecture
Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 111 and 111H combined: maximum credit, one course.
C-ID: GEOL 100.
ERTH 111L Dynamic Earth - Physical Geology Laboratory (1 Unit)
Corequisites: ERTH 111 (prior to or concurrently) or ERTH 111H (concurrently).
Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 1 or MATH 41.
Hours: 54 (54 lab)
Laboratory approach to earth materials and processes, including rock and mineral identification and interpretation, plate tectonic rock cycle, topographic map and aerial photo interpretation, structural geology (folds and faults), geologic cross sections and geologic maps. Activities include four field trips to local areas of geologic interest. Required of all Geology majors.
SBCC General Education: SBCCGE Area A Lab
Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable
C-ID: GEOL 100L.

ERTH 112 History Of The Earth (3 Units)
Course Advisories: concurrent enrollment in ERTH 112L and ERTH 131 or ERTH 132.
Skills Advisories: Eligibility for ENG 103.
Hours: 54 (54 lecture)
Introduction to the geologic history of the earth, using plate tectonic concepts, stratigraphy, geologic dating, fossils and evolution. Emphasis on the origin and evolution of continents, oceans, the atmosphere and life on earth. Designed to accommodate both non-science and science majors. Required of Geology majors.
SBCC General Education: SBCCGE Area A Lecture
Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable
C-ID: GEOL 110.

ERTH 112L Historical Geology Laboratory (1 Unit)
Corequisites: ERTH 112.
Skills Advisories: Eligibility for ENG 103.
Hours: 54 (54 lab)
Laboratory approach to understanding the scientific method as it applies to deciphering earth history. Topics include sedimentary rock identification and interpretation, stratigraphy, paleogeographic maps and fossil identification. Activities include field trips to local areas of geologic interest. Required of Geology majors.
SBCC General Education: SBCCGE Area A Lab
Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable
C-ID: GEOL 110L.

ERTH 113 Geology of National Parks (3 Units)
Skills Advisories: Eligibility for ENG 103.
Hours: 54 (54 lecture)
Study of geologic processes and phenomena responsible for shaping the modern landscape, as exemplified within selected National Parks and Monuments. Plate tectonic setting and history emphasized. Designed to accommodate both science and non-science majors.
Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 113, 131, 132, 133, 135 maximum credit, one course: no credit for ERTH 113 if taken after ERTH 111, 111H or 112.

ERTH 114 The Geology Of California (3 Units)
Skills Advisories: Eligibility for ENG 103.
Hours: 54 (54 lecture)
Landscapes of California interpreted by introductory plate tectonics. Volcanism, earthquakes, and other processes are studied in relation to features of the geomorphic provinces of the state. Provinces include the Sierra Nevada, Coast Ranges, Transverse Ranges, Cascades, Klamath Mountains, Modoc Plateau, Central Valley, Mojave, and the Cascade and Range. Appropriate for science and non-science majors.
Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable

ERTH 115 Environmental Geology (3 Units)
Same as: ENVS 115
Course Advisories: Concurrent enrollment in ERTH 115/ENVS 115L and ERTH 131 or ERTH 132.
Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 1 or MATH 41.
Hours: 54 (54 lecture)
Introduction to the problems of volcanism, earthquakes, fire, floods, landslides, and other geologic hazards; air and water pollution, hazardous materials and land use planning. Applications to the Santa Barbara area emphasized. Required of Environmental Studies majors.
SBCC General Education: SBCCGE Area A Lecture
Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable
C-ID: GEOL 130.

ERTH 115L Environmental Geology Laboratory (1 Unit)
Same as: ENVS 115L
Corequisites: ERTH 115/ENVS 115.
Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 1 or MATH 41.
Hours: 54 (54 lab)
Laboratory approach to topics covered in ENVS 115, with emphasis on rock and mineral identification, hazard assessment, geologic resource management, and land use planning. In-lab field trips.
SBCC General Education: SBCCGE Area A Lab
Transfer Information: CSUGE Area B3, IGETC Area 5C, CSU Transferable, UC Transferable
C-ID: GEOL 130L.

ERTH 116 Energy And Natural Resources (3 Units)
Same as: ENVS 116
Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 4 or MATH 41.
Hours: 54 (54 lecture)
Study of formation, exploration, development, and judicious use of natural resources in relation to present and future energy requirements, electricity, conservation, fossil fuels, solar, geothermal, nuclear and hydrogen. Required of Environmental Studies majors.
Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable
ERTH 121 Geology Seminar (1 Unit)
Corequisites: ERTH 111 or ERTH 112 or 111H or 115 or ENVS 115 or ERTH 113 or 114.
Hours: 18 (18 lecture)
Available to students enrolled in Earth Science courses. Attendance is required at the short course each week and select number of department-sponsored seminars, weekend field trips and lectures sponsored by professional associations and institutions. Required of Geology majors. Transfer Information: CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 121 computed as Independent Study; see counselor.

ERTH 122 Dinosaurs (3 Units)
Hours: 54 (54 lecture)
Introduction to the science of dinosaurs, stressing their evolution, ecology, bone structures and extinction. Emphasizes dinosaurian diversity, rise of dinosaurs, and their extinction in a Mesozoic world. Provides for a better perspective on the patterns and trends of all life, living and extinct. Scientific videos and fossil material used in the course.
Transfer Information: CSUGE Area B1, CSUGE Area B2, IGETC Area 5A, CSU Transferable, UC Transferable

ERTH 125 Mineralogy and Resources (5 Units)
Course Advisories: ERTH 111 or ERTH 112 and CHEM 101.
Skills Advisories: MATH 4 and ENG 103.
Hours: 162 (54 lecture, 108 lab)
Introduction to the identification and basic concepts of mineralogy, emphasizing crystallography, crystal chemistry, mineral chemistry, paragenesis of economic minerals and plate tectonics of mineral resources. A portion of the course is devoted to optical mineralogy. Hand-identification of minerals stressed.
Transfer Information: CSUGE Area B1, CSUGE Area B3, IGETC Area 5A, IGETC Area 5C, CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 125 and 232B combined: maximum credit, one course.

ERTH 126 Petrology and Rock-Forming Minerals (5 Units)
Course Advisories: ERTH 111 or ERTH 112 and CHEM 101.
Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 4 or MATH 41.
Hours: 162 (54 lecture, 108 lab)
Designed to familiarize students with the basic fundamentals and classification of rock-forming mineralogy, textures, origins and occurrences of igneous, sedimentary and metamorphic rocks. Use of the polarizer, X-ray and field identification procedures stressed.
Transfer Information: CSUGE Area B1, CSUGE Area B3, IGETC Area 5A, IGETC Area 5C, CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 126 and 232A combined: maximum credit, one course.

ERTH 130V Geologic Field Studies - Hawaii Volcanology (2.5 Units)
Corequisites: ERTH 111 or 111H or 112 or 113 or 114 or 115 or ENVS 115 or ERTH 125 or 126 or 131 or 132 or 133 or 141 or GEOG 101 or ERTH 151.
Skills Advisories: Eligibility for ENG 103.
Hours: 117 (9 lecture, 108 lab)
A twelve-day field-studies course with an emphasis on the structural, plutonic and volcanic features of Kilauea volcano, Hawaii. Kilauea's long-documented eruptive history and easy accessibility make it a training ground for USGS volcanologists. Focuses on the history and features of the volcano and its interactions with the people that live on it.
Transfer Information: CSU Transferable, UC Transferable

ERTH 131 Geologic Field Studies - Eastern Sierra Nevada (2 Units)
Corequisites: ERTH 111 or 111H or 112 or 113 or 114 or 115 or ENVS 115 or ERTH 122 or 125 or 126 or 132 or 141 or GEOG 101 or 106 or ERTH 151.
Hours: 72 (18 lecture, 54 lab)
Five-day field course to study and interpret the geologic features and history of the Eastern Sierra Nevada region. Topics include faults, volcanoes, glaciers, mining and tectonic history of the region. Fee required.
Transfer Information: CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 113, 131, 132, 133, 135 maximum credit, one course: no credit for ERTH 113 if taken after ERTH 111, 111H or 112.

ERTH 132 Geologic Field Studies - Death Valley (2 Units)
Corequisites: ERTH 111 or ERTH 111H or ERTH 112 or ERTH 113 or ERTH 114 or ERTH 115 or ENVS 115 or ERTH 122 or ERTH 125 or ERTH 126 or ERTH 131 or ERTH 141 or GEOG 101 or 106 or ERTH 151.
Hours: 72 (18 lecture, 54 lab)
Five-day field course to study and interpret the geologic features and history of the Death Valley region. Topics include the volcanic, tectonic and hydrologic history of the region. Fee required; see department for information.
Transfer Information: CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 113, 131, 132, 133, 135 maximum credit, one course: no credit for ERTH 113 if taken after ERTH 111, 111H or 112.

ERTH 133 Introductory Geologic Field Seminar - Colorado Plateau (4 Units)
Corequisites: ERTH 111 or ERTH 112 or ERTH 113 or ERTH 114 or ERTH 115 or ENVS 115 or ERTH 125 or ERTH 126 or ERTH 131 or ERTH 132 or ERTH 141 or GEOG 101 or ERTH 151.
Skills Advisories: Eligibility for ENG 103.
Hours: 170 (23 lecture, 147 lab)
Fifteen-day intensive field study of the geology of the Colorado Plateau region. Emphasis on the geologic processes and features of the parks of the Southwest, including the Grand Canyon, Canyonlands, Arches, Capitol Reef, Bryce and Zion National Parks. Designed for students with previous geologic background. Fee required; see department for information.
Transfer Information: CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 113, 131, 132, 133, 135, 137, 138, 233 any or all of these courses combined: maximum credit, one course.

ERTH 134 Geologic Field Studies - Western Sierra Nevada (2.5 Units)
Skills Advisories: Eligibility for ENG 103.
Hours: 81 (27 lecture, 54 lab)
Fee required; contact department for information. Eight-day field course to study and interpret the geologic features and history of the western Sierra Nevada region. Topics include plutonism, landform evolution, glaciation, tectonic and geologic history, and uplift processes of the modern Sierra Nevada.
Transfer Information: CSU Transferable
**ERTH 135 Geologic Field Seminar - Western North America (5 Units)**

Prerequisites: ERTH 111 or ERTH 112 or ERTH 113 or ERTH 114 or ERTH 115 or ERTH 125 or ERTH 126 or ERTH 131 or ERTH 132 or ERTH 133.

Skills Advisories: Eligibility for ENG 103.

Hours: 198 (36 lecture, 162 lab)

Fee required - see department for information. A 23-day field study of the geology of the Western United States and Western Canada. Emphasis on the features, processes and geologic history of the region's parks: Grand Teton, Yellowstone, Glacier/Waterton, Banff, Jasper, Crater Lake and Lassen National Parks. For students with previous geologic background.

Transfer Information: CSU Transferable, UC Transferable

UC Transfer Limit: ERTH 113, 131, 132, 133, 135, 137, 138, 233 any or all of these courses combined: maximum credit, one course.

**ERTH 137 Introductory Field Geology (4.5 Units)**

Prerequisites: ERTH 111 or ERTH 112 or ERTH 125 or ERTH 126 or ERTH 131 or ERTH 132 or ERTH 133.

Course Advisories: ERTH 111L or ERTH 112L.

Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 4 or MATH 41.

Hours: 153 (45 lecture, 108 lab)

Provides intensive field experience in application of field geology equipment, methods, techniques and maintenance procedures. "Hands-on" approach includes use of Brunton compass and tape, aerial photos, plane table and alidade, and geographical mapping.

Transfer Information: CSU Transferable, UC Transferable

UC Transfer Limit: ERTH 113, 131, 132, 133, 135, 137, 138, 233 any or all of these courses combined: maximum credit, one course.

**ERTH 138 Geology Field Camp (4.5 Units)**

Corequisites: ERTH 137.

Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 4 or MATH 41.

Hours: 189 (27 lecture, 162 lab)

Summer Session that consists of 14 consecutive days at a geologic field camp, followed by five eight-hour days in an on-campus laboratory.

Provides for rigorous work experience in field geology for Earth Science majors. Includes field mapping of a "badlands" area, using aerial photographs, topographic maps, geological surveying equipment and earth materials.

Transfer Information: CSU Transferable, UC Transferable

UC Transfer Limit: ERTH 113, 131, 132, 133, 135, 137, 138, 233 any or all of these courses combined: maximum credit, one course.

**ERTH 141 Physical Geography (3 Units)**

Same as: GEOG 101

Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 1 or MATH 41.

Hours: 54 (54 lecture)

A spatial study of Earth's dynamic physical systems and processes. Interrelationships between the basic elements of the physical and human environments are examined, including geology (plate tectonics; volcanoes and earthquakes), geomorphology (formation and modification of landforms; river, coastal, and glacial processes), meteorology (Earth's atmosphere; weather and climate), and hydrology (water on Earth).

SBCC General Education: SBCCGE Area A Lecture

Transfer Information: CSU Transferable, UC Transferable

C-ID: GEOG 110, GEOG 115.

**ERTH 141L Physical Geography Laboratory (1 Unit)**

Same as: GEOG 101L

Corequisites: ERTH 141/GEOG 101.

Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 1 or MATH 41.

Hours: 54 (54 lab)

Laboratory approach to a combination of earth science disciplines, including cartography, geology, geomorphology, meteorology and oceanography. Remote sensing techniques are utilized in 75% of laboratory activities.

SBCC General Education: SBCCGE Area A Lab

Transfer Information: CSU Transferable, UC Transferable

C-ID: GEOG 110, GEOG 115.

**ERTH 142 Economic Geography (3 Units)**

Same as: GEOG 105

Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 001 or MATH 041.

Hours: 54 (54 lecture)

Explores the impact humans have on their environment and on each other through resource exploitation and economic activity. Investigates the development and global impact of diverse geographies, the effect of place on economic sectors, and the role of place in strengthening or weakening economies. Also addresses regional patterns of principal economic activities of the world, with an emphasis on economic development, urbanization, transportation and the environment.

SBCC General Education: SBCCGE Area B

Transfer Information: CSU Transferable, UC Transferable

**ERTH 151 Introductory Physical Oceanography (3 Units)**

Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 1 or MATH 41.

Hours: 54 (54 lecture)

Designed for students desiring a broadly-based analysis of the physical aspects of the oceans. Study of the origin of the continents and oceans, marine geology, chemistry of seawater, currents, waves, tides and the ocean environment. Required of Marine Science majors.

SBCC General Education: SBCCGE Area A Lecture

Transfer Information: CSU Transferable, UC Transferable

UC Transfer Limit: ERTH 151 and BIOL 124 combined: maximum credit, one course.

**ERTH 151L Introductory Physical Oceanography Laboratory (1 Unit)**

Corequisites: ERTH 151.

Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 1 or MATH 41.

Hours: 54 (54 lab)

Lab exercises in marine geology, sedimentation, navigation, currents, waves, chemical and physical properties of seawater, and plate tectonics. Field trips to beach and mountains to study first-hand oceanographic processes and products. Required of Marine Science majors.

SBCC General Education: SBCCGE Area A Lab

Transfer Information: CSU Transferable, UC Transferable
ERTH 152 Weather and Climate (3 Units)
Same as: GEOG 152
Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 95.
Hours: 54 (27 lecture, 27 lab)
Fundamentals of meteorology, including the nature of the atmosphere, solar radiation and energy balances, circulation of the atmosphere, air masses and fronts, atmospheric moisture, clouds and fog, precipitation, cyclones, weather analysis and forecasting, climate, and climate change.

ERTH 152L Weather and Climate Laboratory (1 Unit)
Same as: GEOG 152L
Corequisites: ERTH 152 or GEOG 152.
Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 4 or MATH 41.
Hours: 36 (36 lecture)
Laboratory approach to topics covered in the Weather and Climate lecture (ERTH 152/GEOG 152). Exercises introduce fundamentals of meteorology, including the nature of the atmosphere, circulation of the atmosphere, air temperature and humidity, and weather analysis and forecasting. Students collect and analyze a variety of environmental data.

ERTH 171 Introduction To Geographic Information Systems And Maps (2 Units)
Same as: GEOG 171
Corequisites: ERTH 172 or GEOG 172.
Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 4 or MATH 41.
Hours: 36 (36 lecture)
Techniques, tools and theories used to examine geographic information. Includes the structure, uses, and basic operations of a Geographic Information System (GIS). Cartography and cartographic design are incorporated, as well as overviews of aerial photography, remote sensing, and global positioning systems. Includes uses of GIS software in business, urban planning, resource management and scientific research.

Transfer Information: CSUGE Area B3, IGETC Area 5C, CSU Transferable, UC Transferable
C-ID: GEOG 130.

ERTH 172 Geographic Information Systems: Software Applications (2 Units)
Same as: GEOG 172
Corequisites: GEOG 171 or ERTH 171.
Skills Advisories: Eligibility for ENG 103 and proficiency in MATH 4 or MATH 41.
Hours: 54 (27 lecture, 27 lab)
Extensive practice with a GIS package, accompanied by exploration of the range of applications in which GIS is used (resource management, public works, business, planning, scientific research). Covers key skills for operating GIS software packages, including geographical data acquisition, creation, management, analysis and output.

Transfer Information: CSU Transferable, UC Transferable
C-ID: GEOG 155.

ERTH 231A Field Study - Mineralogy and Mineral Resources of the Eastern Sierra Nevada (2 Units)
Corequisites: ERTH 111 or ERTH 111H or ERTH 112 or ERTH 113 or ERTH 114 or ERTH 115 or ENVS 115 or ERTH 122 or ERTH 125 or ERTH 126 or ERTH 131 or ERTH 132 or ERTH 133 or ERTH 141 or GEOG 101 or ERTH 231B.
Hours: 72 (18 lecture, 54 lab)
Fee required – see department for information. Five-day field course to study and interpret the mineralogy and resources of the Eastern Sierra Nevada region. Topics include metallic and industrial mineral resources, energy resources, and mining of the region.

Transfer Information: CSU Transferable, UC Transferable

ERTH 231B Field Study - Energy Resources of the Eastern Sierra Nevada (2 Units)
Corequisites: ERTH 111 or ERTH 111H or ERTH 112 or ERTH 113 or ERTH 114 or ERTH 115 or ENVS 115 or ERTH 116 or ENVS 116 or ERTH 122 or ERTH 125 or ERTH 126 or ERTH 131 or ERTH 132 or ERTH 133 or ERTH 141 or GEOG 101 or ERTH 151 or ERTH 231A.
Hours: 72 (18 lecture, 54 lab)
Fee required – see department for information. Five-day field course to study and interpret the energy resources of the Eastern Sierra Nevada region. Topics include wind, solar-thermal electric, solar photovoltaic, micro hydropower, hydropower, and geothermal energy resources of the region.

Transfer Information: CSU Transferable, UC Transferable

ERTH 232A Field Study - Petrology of the Death Valley Region (2 Units)
Prerequisites: ERTH 112 or ERTH 113 or ERTH 114 or ERTH 115 or ENVS 115.
Corequisites: ERTH 111 or ERTH 111H or ERTH 122 or ERTH 125 or ERTH 126 or ERTH 131 or ERTH 132 or ERTH 133 or ERTH 141 or GEOG 101 or ERTH 151.
Skills Advisories: Eligibility for ENG 98 and ENG 103.
Hours: 72 (18 lecture, 54 lab)
Five-day field course to study and interpret the petrology of the Death Valley region. Topics include field recognition and interpretation of igneous, sedimentary and metamorphic rocks, and mining of the region.

Fee required – see department for information.

Transfer Information: CSU Transferable, UC Transferable

ERTH 232B Field Study - Mineral Resources and Plate Tectonic History of the Death Valley Region (2 Units)
Corequisites: ERTH 111 or ERTH 111H or ERTH 112 or ERTH 113 or ERTH 114 or ERTH 115 or ENVS 115 or ERTH 122 or ERTH 125 or ERTH 126 or ERTH 131 or ERTH 132 or ERTH 133 or ERTH 141 or GEOG 101 or ERTH 151.
Skills Advisories: Eligibility for ENG 98 and ENG 103.
Hours: 72 (18 lecture, 54 lab)
Five-day field course to study and interpret the mineral resources and tectonic history of the Death Valley region. Topics include field recognition and interpretation of rocks, mineral deposits, and structures of the region. Fee required – see department for information.

Transfer Information: CSU Transferable, UC Transferable

UC Transfer Limit: ERTH 126 and 232A combined: maximum credit, one course.
ERTH 233 Advanced Geologic Field Seminar - Colorado Plateau (4 Units)
Prerequisites: ERTH 133.
Skills Advisories: Eligibility for ENG 103.
Hours: 170 (23 lecture, 147 lab)
15-day intensive field study of the geology of the Colorado Plateau region. Emphasis on the stratigraphy, tectonic evolution and geologic history of the parks of the Southwest, including the Grand Canyon, Canyonlands, Arches, Capitol Reef, Bryce and Zion National Parks. Designed for second-year geology students. Fee required - see department for information.
Transfer Information: CSU Transferable, UC Transferable
UC Transfer Limit: ERTH 113, 131, 132, 133, 135, 137, 138, 233 any or all of these courses combined: maximum credit, one course.

ERTH 299 Independent Study in Earth Science (1-4 Units)
Limitations on Enrollment: Completion of a minimum of 12 units at SBCC, with a 2.5 G.P.A., and a minimum of six units, with a 3.0 G.P.A. within the department.
Hours: 192 (192 lab)
For complete information, see "Independent Study" in the Catalog Index.
Course restricted to 3 repetitions
Transfer Information: CSU Transferable