

# EARTH SCIENCES (ESC)

## ESC 100 F Physical Geology

3 Units

54 hours lecture per term. This introductory course explores the physical composition of the earth and those processes that modify its surface. Topics include rocks and minerals, plate tectonics, earthquakes, volcanoes, landslides, flooding, groundwater, beach processes, and earth resources. Contemporary environmental changes such as global warming and resource acquisition problems will also be discussed. Concurrent enrollment in ESC 100LF Physical Geology Lab is recommended. Field trips may be required outside of regularly-scheduled class times. Letter Grade or Pass/No Pass option. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC (C-ID: GEOL 100)

## ESC 100LF Physical Geology Lab

1 Unit

**Corequisite(s):** ESC 100 F with a grade of C or better or Pass.

54 hours lab per term. Physical Geology Lab includes identification of minerals and rocks, interpretation of topographic maps and geologic folios, study of landforms and rock structures and field studies. Field trips may be required outside of regularly-scheduled class time. Letter Grade or Pass/No Pass option. (Degree Credit) (CSU) (UC) CSU GE, IGETC (C-ID: GEOL 100L)

## ESC 101 F Earth Science Survey

3 Units

54 hours lecture per term. This course explores the fields of geology, oceanography, meteorology, and astronomy. Topics include earthquake and volcanic processes, global current patterns, beach formation, hurricane and tornado development, and star and planetary evolution. Special emphasis is placed on contemporary human-induced environmental changes such as global warming and resource acquisition. Class discussions will also focus on the interaction between science and society. Field trips may be required outside of regularly-scheduled class times. Laboratory not required but recommended. (Degree Credit) (CSU) (UC Credit limitation; no credit for ESC 101 F if taken after college level class in Astronomy, Chemistry, Geology, or Physics) AA GE, CSU GE, IGETC (C-ID: GEOL 120)

## ESC 101LF Earth Science Survey Lab

1 Unit

**Corequisite(s):** ESC 101 F with a grade of C or better.

54 hours lab per term. This course enhances topics covered in the ESC 101 F. This course includes exercises in identifying minerals and rocks, reading topographic maps, analyzing earthquakes, interpreting coastal processes, forecasting weather, and recognizing the stars and planets. Field trips may be taken. (Degree Credit) (CSU) (UC Credit Limitation; no credit for ESC 101LF if taken after college level class in astronomy, meteorology, geology or oceanography). CSU GE, IGETC (C-ID: GEOL 120L)

## ESC 102 F Survey of Natural Disasters

3 Units

54 hours lecture per term. This course explores those natural disasters that affect human activities. Topics include earthquakes, floods, landslides, volcanoes, hurricanes, tornados and asteroid/meteor impacts. The consequences of pollution and population growth will also be explored. Hypothetical and case histories of natural disasters will also be studied. Class discussions will focus on aspects of regional planning, environmental laws and the interaction between science and society. Field trips are optional. Letter Grade or Pass/No Pass option. (Degree Credit) (CSU) (UC) AA GE

## ESC 103 F Historical Geology

4 Units

54 hours lecture and 54 hours lab per term. This course covers the Earth's origin, geological development through time and history of its life are presented using the plate tectonic theory. The importance of environment to evolution and extinction of life forms are stressed. Study and classification of major rock and fossil groups, interpretation of geologic and topographic maps, and application of rock and fossil interpretations to geologic problems are included. Field trips may be required outside of regularly-scheduled class times. Letter Grade or Pass/No Pass option. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC (C-ID: GEOL 111)

## ESC 104 F Geology of National Parks and Monuments

3 Units

54 hours lecture per term. This course is a description of the broad geologic features of North America with special emphasis on the U.S. National Parks and Monuments. Photographic slides and rock samples will be used to illustrate the geologic significance of the parks and monuments. Utilizing the plate tectonic theory, a geologic history of North America will be deduced from the descriptive geology. Field trips may be required outside of regularly-scheduled class times. Letter Grade or Pass/No Pass option. (Degree Credit) (CSU) AA GE, CSU GE

## ESC 105 F Introduction to Weather and Climate

3 Units

54 hours lecture per term. This course examines the physical properties of the atmosphere including solar heating and cooling, atmospheric circulation, weather systems, extreme weather, atmospheric optics, climate change, and weather radar, maps and forecasting. The effects of human activities on Earth's climate will be emphasized. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC

## ESC 105LF Introduction to Weather and Climate Laboratory

1 Unit

**Corequisite(s):** ESC 105 F with a grade of C or better.

9 hours lecture and 27 hours lab per term. This course offers lab studies to correspond to material covered in ESC 105 F. Fundamental concepts in meteorology and measurement techniques including selected mathematical concepts used in developing an understanding of weather and climate will be covered. Analysis of real-time weather data will be stressed. Each lab experience will be preceded by an orientation lecture/discussion period. This course may include field trips. (Degree Credit) (CSU) (UC) CSU GE, IGETC

## ESC 106 F Geology of Orange County Area

2 Units

36 hours lecture per term. This course examines the physical and historical Geology of the Orange County Area. The county will be analyzed for faults and folds, rock and fossil occurrences, geologic hazards, and mineral deposits. Pertinent state laws and ordinances relating to geologic concerns will be reviewed. Field trips may be required outside of regularly-scheduled class time. Letter Grade or Pass/No Pass option. (Degree Credit) (CSU)

## ESC 107 F Earth Science for Educators

4 Units

54 hours lecture and 54 hours lab per term. This course engages students in a study of our dynamic planet, including its astronomy, geology, oceanography, and meteorology. Topics include solar system and planetary formation, earthquake and volcanic processes, waves and beach processes, global oceanic and atmospheric circulation patterns, severe storm development, and climate change. While open to all students, the course is oriented towards preparing future science teachers. Field trips may be required outside of regularly-scheduled class time. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC

**ESC 110 F Introduction to Climate Science****3 Units**

54 hours lecture per term. This course engages students in a study of climate science including global warming and climate change. Students will examine interactions among Earth's various climate subsystems - the hydrosphere, lithosphere, atmosphere and biosphere - and how exchanges of energy and matter between them govern Earth's climate. The interaction of humans with the climate system will be woven throughout. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC

**ESC 116 F Astronomy****3 Units****Advisory:** MATH 040 F.

54 hours lecture per term. This course is an introduction to the universe and the techniques used to study it. Topics include the history of astronomy, motions of the night sky, the earth moon system, the solar system, the sun, formation and death of stars, the Milky Way, cosmology, and life in the Universe. High school algebra and plane geometry or the equivalents are highly desirable. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC

**ESC 116HF Honors Astronomy****3 Units****Advisory:** MATH 040 F.

54 hours lecture per term. This course is an introduction to the universe and the techniques used to study it. Topics include the history of astronomy, motions of the night sky, the earth moon system, the solar system, the sun, formation and death of stars, the Milky Way, cosmology, and life in the universe. As an Honors section this class will employ enhanced teaching methods such as a seminar approach, more research-based writing assignments, and assignments calling for a higher level of critical thinking. High school algebra and plane geometry or the equivalents are highly desirable. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC

**ESC 116LF Astronomy Lab****2 Units****Advisory:** MATH 020 F or math skills clearance and ESC 116 F.

72 hours lab per term. This course introduces the student to astronomical viewing and measurement as well as analysis of astronomical data. Students will do lab experiments to understand principles of astronomy and data analysis. They will use telescopes to make observations and gather data (or use computer images) and perform exercises relating to the moon, planets, stars, and galaxies. A field trip for dark sky observation may be arranged. (Degree Credit) (CSU) (UC) CSU GE, IGETC

**ESC 117 F Field Astronomy****1 Unit****Advisory:** ESC 116 F and MATH 040 F.

18 hours lecture per term. This course is an introduction to methods of observational astronomy including naked eye, binocular and telescopic observations. Lectures will cover celestial sphere, celestial coordinates, motions of the sky, star charts and telescope optics. Students will be trained in using star charts, planispheres, planetarium software and telescopes. Field trips outside of regularly-scheduled class time. Overnight camping required. (Degree Credit) (CSU)

**ESC 120 F Geology of California****3 Units**

54 hours lecture per term. This course examines the physical and historical geology of California. Each of California's natural provinces will be analyzed for tectonic structures, rock and fossil occurrences, geologic hazards, and mineral deposits. Pertinent state laws and ordinances relating to geologic concerns will be reviewed. Field trips may be required outside of regularly-scheduled class time. Letter Grade or Pass/No Pass option. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC (C-ID: GEOL 200)

**ESC 130 F Introduction to Oceanography****3 Units**

54 hours lecture per term. The lectures present a survey of the geological, physical, chemical, and biological principles and processes of oceanography. This course examines how these processes interact to form a variety of habitats within the marine ecosystem. An overview is provided of the physical properties of these habitats, along with the distribution and characteristics of organisms found within them. The interactions of humans with the marine environment is presented, as is an introduction to oceanographic tools and their uses. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC

**ESC 130HF Honors Introduction to Oceanography****3 Units**

54 hours lecture per term. This Honors-enhanced course presents a survey of the geological, physical, chemical, and biological principles and processes of oceanography. An overview is provided of the geological, physical and chemical properties of ocean ecosystems and examples are given of characteristics of organisms found within them. The role of technology and its application to studying the world ocean is woven throughout. Students will develop an understanding of the interaction of humans with the world ocean, especially in view of the critical scientific, environmental, social and political issues that emerge from ocean conservation efforts. Students are expected to critically analyze scientific and journalistic information and engage in written and oral debate to reach a deeper understanding of these issues. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC

**ESC 130LF Introduction to Oceanography Field Experience****1 Unit****Corequisite(s):** ESC 130 F with a grade of C or better.

9 hours lecture and 27 hours lab per term. This course offers field studies to correspond to material covered in ESC 130 F. Each field experience will be preceded by an orientation lecture/discussion period. May include field work from boats. (Degree Credit) (CSU) (UC) CSU GE, IGETC

**ESC 140 F Geology of California Coastal Areas****2 Units**

36 hours lecture per term. This course involves lecture and field study of geologic processes and features in selected areas along California's coastline. Lectures will examine the geologic importance of coastal areas and how to recognize key geologic features in the field. Particular attention will be focused on identifying geologic hazards and understanding the natural resource potential. Students are trained in various field study techniques and the use of scientific instruments. Field trips may be required outside of regularly-scheduled class time. (Degree Credit) (CSU)

**ESC 141 F Geology of the Anza-Borrego Desert State Park Area****1 Unit**

18 hours lecture per term. This course involves lecture and field study of geologic processes and features in the Anza-Borrego Desert State Park area. Lectures will examine the geologic importance of the area and how to recognize key geologic features in the field. Particular attention will be focused on identifying geologic hazards and understanding the natural resource potential. Students are trained in various field study techniques and the use of scientific instruments. Field trips may be required outside of regularly-scheduled class time. (Degree Credit) (CSU)

**ESC 142 F Geology of Mojave Desert Area****1 Unit**

18 hours lecture per term. This course involves lecture and field study of geologic processes and features in the Mojave Desert area. Lectures will examine the geologic importance of the area and how to recognize key geologic features in the field. Particular attention will be focused on identifying geologic hazards and understanding the natural resource potential. Students are trained in various field study techniques and the use of scientific instruments. Field trips may be required outside of regularly-scheduled class times. (Degree Credit) (CSU)

**ESC 143 F Geology of the Owens Valley and Mammoth Lakes Area 1 Unit**

18 hours lecture per term. This course involves lecture and field study of geologic processes and features in the Owens Valley-Mammoth Lakes area. Lectures will examine the geologic importance of the area and how to recognize key geologic features in the field. Particular attention will be focused on identifying geologic hazards and understanding the natural resource potential. Students are trained in various field study techniques and the use of scientific instruments. Field trips may be required outside of regularly-scheduled class time. (Degree Credit) (CSU)

**ESC 144 F Geology of Southern California Mountain Areas 1 Unit**

18 hours lecture per term. This course involves lecture and field study of geologic processes and features in the Transverse Ranges and Santa Ana Mountains area. Lectures will examine the geologic importance of the area and how to recognize key geologic features in the field. Particular attention will be focused on identifying geologic hazards and understanding the natural resource potential. Students are trained in various field study techniques and the use of scientific instruments. Field trips may be required outside of regularly-scheduled class time. (Degree Credit) (CSU)

**ESC 145 F Geology of the Death Valley National Park Area 1 Unit**

18 hours lecture per term. This course involves lecture and field study of geologic processes and features in the Death Valley National Park area. Lectures will examine the geologic importance of the area and how to recognize key geologic features in the field. Particular attention will be focused on identifying geologic hazards and understanding the natural resource potential. Students are trained in various field study techniques and the use of scientific instruments. Field trips may be required outside of regularly-scheduled class times. (Degree Credit) (CSU)

**ESC 146 F Geology of the Joshua Tree National Park Area 1 Unit**

18 hours lecture per term. This course involves lecture and field study of geologic processes and features in the Joshua Tree National Park area. Lectures will examine the geologic importance of the area and how to recognize key geologic hazards and the natural resource potential. Students are trained in various field study techniques and the use of scientific instruments. Field trips may be required outside of regularly-scheduled class time. (Degree Credit) (CSU)

**ESC 147 F Geology of Colorado Plateau Areas 2 Units**

36 hours lecture per term. This course involves lecture and field study of geologic features and processes in selected areas of the Colorado Plateau. Lectures will explore the geologic significance of these areas and how to recognize key geologic hazards and resource potential. Areas of study may include Grand Canyon, Zion, Bryce Canyon, Capital Reef, Arches, and Canyonlands national parks. Students will be trained to use various scientific tools for conducting geologic field studies. Field trips may be required outside of regularly-scheduled class time. (Degree Credit) (CSU)

**ESC 190 F Environmental Geology 3 Units**

54 hours lecture per term. This course explores those geologic processes that influence human activities. Topics include the geologic hazards, such as earthquakes, floods, landslides, and volcanoes; the occurrences and limitations of natural resources; and the consequences of pollution and waste disposal on the earth. Hypothetical and case histories of natural disasters will be studied. Class discussions will also focus on geologic aspects of regional planning, environmental laws, and the interaction between science and society. Field trips may be required outside of regularly-scheduled class times. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC (C-ID: GEOL 130)

**ESC 196 F Regional Field Studies in Geology 1 Unit**

18 hours lecture per term. This course involves lecture and field study of geologic processes and features in selected areas throughout the Southwestern United States. During a given semester, multiple sections may be offered to different study areas or for different topics. Lectures will examine the geologic importance of the area to be visited and how to recognize key geologic features in the field. Study areas include, but are not limited to, the Mojave Desert, the Sierra Nevada, and coastal areas. Areas outside of California (i.e., Arizona, New Mexico) may also be selected. Students are trained in various field study techniques and the use of scientific instruments. Field trips may be required outside of regularly-scheduled class time. (Degree Credit) (CSU)

**ESC 230 F Coastal Oceanography 3 Units**

36 hours lecture and 54 hours lab per term. This course engages students in a study of the geological, physical, chemical, and biological oceanography of the coastal ocean of Southern California and the California Current Large Marine Ecosystem. (Degree Credit) (CSU) (UC)