

# ENVIRONMENTAL GEOSCIENCE (EGEO)

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## EGEO 100 - Environmental Geology

The course examines problems of mineral, energy and water resources, waste disposal, soils and health, geologic hazards, and land use. Resources are the common property of all people. Sustainable use of resources is poised by equitable distribution of cost and benefits among diverse peoples.

Credits: 3

Term(s) Typically Offered: Offered Fall & Spring Terms

Thematic Thread(s): Citizenship & Social Problems, Conservation, Technology & Imagination, Human Diversity & Well-Being, Institutions & Human Innovations, Transfer Thread Completion Course, United States in Global Context

## EGEO 101 - Physical Geology

Emphasis is placed upon those processes acting to create earth materials, landforms, and structures in and on the earth.

Credits: 3

Term(s) Typically Offered: Offered as Needed

## EGEO 110 - Environmental Geology Lab

Complement to EGEO 100; laboratory study of geologic hazards and geologic resources with a focus on local environmental issues. Course may require a weekend field trip.

Prerequisite: EGEO 100 (may be taken concurrently)<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 1

Term(s) Typically Offered: Offered Fall & Spring Terms

## EGEO 111 - Physical Geology Lab

Complement to EGEO 101; laboratory studies of minerals and rocks illustrate the concepts of EGEO 101.

Prerequisite: EGEO 101 (may be taken concurrently)<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 1

Term(s) Typically Offered: Offered as Needed

## EGEO 121 - Meteorology/Lab

Introduction to principles controlling weather and their effect on people and the environment. Includes lab.

Credits: 4

Term(s) Typically Offered: Offered Fall & Spring Terms

## EGEO 131 - Oceanography

Introduction to the physical, chemical and biological aspects of the marine environment.

Credits: 3

Term(s) Typically Offered: Offered Fall Terms

Thematic Thread(s): Conservation, Technology & Imagination, Transfer Thread Completion Course, United States in Global Context

## EGEO 139 - Foundations of Academic Discovery

Foundations of Academic Discovery serves as the entry point to the Rock Integrated Studies Program. With its strong faculty-student interaction, the course promotes intellectual inquiry, critical and creative thinking, and computer skills needed for academic success. Through varied content, the course introduces students to academic discourse and information literacy while exploring topics such as diversity and inclusion and global awareness. This course will set students along the path to becoming engaged with issues and scholarship important to a 21st century education while they learn about themselves and their place in the world.

Credits: 3

Term(s) Typically Offered: Offered Fall Terms

Enrollment limited to students with a semester level of Freshman 1 or Freshman 2.

Enrollment limited to students with the ROCK STUDIES 2 STUDENT or ROCK STUDIES STUDENT attributes.

## EGEO 190 - Experimental

A unique and specifically focused course within the general purview of a department which intends to offer it on a "one time only" basis and not as a permanent part of the department's curriculum.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

## EGEO 195 - Workshop

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

Credits: 1-6

Term(s) Typically Offered: Offered as Needed

## EGEO 198 - Selected Topics

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

## EGEO 201 - Earth Materials and Processes/Lab

Overview of the composition and structure of Earth. Introduction to fundamental physical and chemical Earth processes. Identification of rocks and minerals based on observation and study of physical properties. Includes lab.

Credits: 4

Term(s) Typically Offered: Offered Fall Terms

## EGEO 202 - Earth History/Lab

The evolutionary history of the earth and its life. Two Saturday field trips required.

Prerequisite: EGEO 201<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 4

Term(s) Typically Offered: Offered Spring Terms

**EGEO 203 - Quantitative Methods**

Review of mathematical techniques and principles. Training in the application of quantitative methods to the understanding and analysis of geological and environmental problems. Students will apply a variety of mathematical techniques to a range of geological and environmental problems. Emphasis will be placed on practical applications of quantitative methodology and the development and use of spreadsheets to manage, analyze, and present data sets.

Prerequisites: EGEO 202<sup>D</sup> and (MATH 125<sup>D</sup> or MATH 225<sup>D</sup> or MATH 230<sup>D</sup>)

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Spring Terms

**EGEO 221 - Weather and Climate Forecasting**

An analysis and use of local and regional computer-collected surface and upper air weather data to forecast weather. A study of past records of climate as clues to future changes. Includes lab.

Prerequisite: EGEO 121<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

**EGEO 231 - Aerial Photography Interpretation**

Introduction to photogrammetry, remote sensing, and interpretation of geologic and cultural imagery.

Prerequisites: EGEO 101<sup>D</sup> or EGEO 201<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

**EGEO 251 - Aviation Meteorology**

This course is a study of weather conditions commonly encountered in aviation. The subject is treated from the viewpoint of the forecaster and the pilot. Includes lab.

Prerequisite: EGEO 121<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

**EGEO 271 - Geotechniques: Lab**

Training in laboratory techniques and instruments for geological, geophysical and environmental surveys.

Credits: 2

**EGEO 272 - Introduction to Georeports/Lab**

Training in the grammatical and stylistic conventions of technical writing in environmental, geoscientific and geographical disciplines.

Prerequisite: ENGL 102<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 1

Term(s) Typically Offered: Offered Spring Terms

**EGEO 290 - Experimental**

A unique and specifically focused course within the general purview of a department which intends to offer it on a "one time only" basis and not as a permanent part of the department's curriculum.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

**EGEO 295 - Workshop**

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

Credits: 1-6

Term(s) Typically Offered: Offered as Needed

**EGEO 298 - Selected Topics**

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

**EGEO 303 - Paleontology/Lab**

An introduction to the fossil record and evolution of life through earth history, including the nature of science, marine and land dwelling organisms and basic theories of evolution and extinction of organisms.

Prerequisites: EGEO 201<sup>D</sup> and EGEO 202<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 4

Term(s) Typically Offered: Offered Spring Terms

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 323 - Planetary Geology**

Systematic study of geological processes that have operated on the planets, natural satellites, and minor bodies in the Solar System. Course will cover solar system formation and evolution, planetary interiors, surficial processes, the structure and history of individual planetary bodies. Quantitative techniques will be used to examine data from current and historic exploration missions.

Prerequisites: EGEO 202<sup>D</sup> and EGEO 203<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Spring Terms Even

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 327 - Structural Geology**

Origin and description of primary and secondary structures of sedimentary, igneous, and metamorphic rocks.

Prerequisites: EGEO 201<sup>D</sup> and (EGEO 202<sup>D</sup> or PNGE 201<sup>D</sup>)

<sup>D</sup> Requires minimum grade of D.

Credits: 4

Term(s) Typically Offered: Offered Fall Terms

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 328 - Plate Tectonics**

Plate tectonics is the study of the motion of the lithosphere and deformation of the earth's crust on a regional scale. The course will evaluate the plate tectonic paradigm in terms of its historical evolution and modern application to understanding earth processes. The course examines a broad range of tectonic phenomena and considers the specific geological and geophysical processes involved. Topics covered include the uplift, deformation and metamorphism of mountain belts, the formation of ocean basins, the subsidence of sedimentary basins, the collision of continents and volcanic arcs, earthquake seismology of plate boundaries, magmatism related to plate processes, and tectonics and landscapes.

Prerequisite: EGEO 202<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Spring Terms Odd

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 340 - Air Pollution Meteorology**

A study of meteorological parameters of air pollution concentration, dispersion, and removal. Includes air pollution forecasting and modeling.

Prerequisite: EGEO 121<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Spring Terms Odd

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 341 - Geomorphology/Lab**

A study of landforms, their origin and relation to geologic processes, structure and climate.

Prerequisites: EGEO 201<sup>D</sup> or GES 150<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Spring Terms

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 342 - Glacial Geology/Lab**

A study of erosional and depositional landforms left by glaciers and their meltwaters. Glacial landforms and soils are examined on maps, air photos and in the field.

Prerequisites: GES 150<sup>D</sup> or EGEO 202<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Fall Terms Even

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 351 - Mineralogy/Lab**

Systematic crystallography, crystal chemistry, physics, genesis, occurrence, and identification of minerals.

Prerequisites: EGEO 201<sup>D</sup> and CHEM 108<sup>D</sup> and CHEM 112<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 4

Term(s) Typically Offered: Offered Fall Terms Even

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 352 - Petrology/Lab**

Classification, occurrence, and genesis of igneous, sedimentary and metamorphic rocks. Identification using hand specimens and polarizing microscope (thin sections).

Prerequisite: EGEO 351<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 4

Term(s) Typically Offered: Offered Spring Terms Odd

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 358 - Introduction to Geophysics/Lab**

An introduction to geophysics and geophysical methods and their use in the study of Earth's interior. Emphasis will be placed on illuminating subsurface geological features and applications in fields such as groundwater studies, development of energy resources and environmental studies.

Prerequisites: PHYS 211<sup>C</sup> and MATH 225<sup>C</sup> and EGEO 201<sup>C</sup>

<sup>C</sup> Requires minimum grade of C.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 360 - Introduction to Hydrology/Lab**

A study of the occurrence and movement of water and human's effect on this basic resource.

Prerequisite: EGEO 201<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Fall Terms

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 362 - Stratigraphy/Lab**

Principles of stratigraphy, stratigraphic mapping, and graphic techniques used in stratigraphic interpretation. Two Saturday field trips may be required.

Prerequisites: EGEO 201<sup>D</sup> and EGEO 202<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 4

Term(s) Typically Offered: Offered Fall Terms Odd

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 368 - Women in Science**

This course will explore the issues of women in science. Specifically it will address the issues of gender in relation to the theory and practice of science and technology. The course content will use case studies to explore women that have made significant contributions to science despite barriers limiting their access to education and professional organizations. The content will cover topics including how the development of educational systems and professions affected women over the centuries, how scientific approaches have evolved, and how women meet challenges in today's scientific community. The case studies will provide students with the opportunity to analyze and synthesize the information presented into an understanding on the evolution of scientific thought and women's roles in science.

Credits: 3

Term(s) Typically Offered: Offered Winter Terms

Thematic Thread(s): Human Diversity & Well-Being, Transfer Thread Completion Course

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 390 - Experimental**

A unique and specifically focused course within the general purview of a department which intends to offer it on a "one time only" basis and not as a permanent part of the department's curriculum.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 395 - Workshop**

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

Credits: 1-6

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 398 - Selected Topics**

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 399 - Field Camp**

Field Camp is a final requirement and is usually conducted at a field study location.

Credits: 1-9

Term(s) Typically Offered: Offered as Needed

**EGEO 448 - X-ray Spectrometry**

Concepts of x-ray production and interaction with crystalline materials. Application of x-ray diffraction methods for identification of minerals, and x-ray fluorescence techniques for chemical analysis. One lecture and one two-hour laboratory per week.

Prerequisites: EGEO 201<sup>D</sup> and CHEM 107<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 450 - Internship**

Supervised placement and research in selected public and private agencies. Permission of chairperson.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 451 - Geochemistry/Lab**

Basic thermodynamics applied to the geochemistry of natural systems. The course will focus on low temperature inorganic reactions that are important for the environmental fate and transport of contaminants in the environment. The course will require the use of computer spreadsheets and models to solve geochemical problems covered in lecture. Three hours of lecture and one hour of computer lab.

Prerequisites: EGEO 201<sup>D</sup> and CHEM 108<sup>D</sup> and CHEM 112<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 4

Term(s) Typically Offered: Offered Fall Terms Odd

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 453 - Geotechniques: Geochemistry**

Laboratory and field experiments to study the geochemistry of local environmental systems. Field sampling, in-field and laboratory analysis, and construction of experimental systems will be conducted. Field trips for sample collection will occur weekly.

Prerequisite: EGEO 451<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 1

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 458 - Geophysical Field Methods/Lab**

An introduction to seismic field methods and their use in the study of Earth's interior. Emphasis will be placed on the use of seismic methods to characterize subsurface geological features and applications in fields such as groundwater studies, development of energy resources and environmental studies.

Prerequisite: EGEO 358<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 460 - Hydrogeology**

A study of the quantitative and qualitative interrelationships of geologic materials and processes with ground water.

Prerequisite: EGEO 360<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Spring Terms Even

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 469 - Field Investigations in the Geosciences**

This course will provide students with the opportunity to practice the nature of fieldwork by observing, interpreting, collecting data and analyzing physical and human landscapes, and the natural, cultural and economic forces that are shaping them.

Credits: 1-3

Term(s) Typically Offered: Offered Summer Terms

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 476 - Geotechniques: Geophysics**

Lab and field techniques.

Prerequisite: EGEO 460 (may be taken concurrently)<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Corequisite(s): EGEO 327

Credits: 1

Enrollment limited to students with a semester level of Senior 1 or Senior 2.

**EGEO 481 - Geologic Map Interpretation**

A seminar for advanced undergraduates in whom students and staff participate in map interpretation. One two-hour lab per week. Senior standing or permission of the instructor.

Corequisite(s): EGEO 362

Credits: 1

Enrollment limited to students with a semester level of Senior 1 or Senior 2.

**EGEO 482 - Senior Seminar**

A seminar for advanced undergraduates in which students and staff participate in discussions concerning classical and current geological problems. Senior standing or permission of the instructor.

Credits: 1

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 490 - Independent Study**

Independent work on a topic in the earth sciences selected by the student with permission and advice of the instructor. Independent Study courses give students the opportunity to pursue research and/or studies that are not part of the university's traditional course offerings. Students work one on one or in small groups with faculty guidance and are typically required to submit a final paper or project as determined by the supervising professor.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 495 - Workshop**

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

Credits: 1-6

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**EGEO 498 - Selected Topics**

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.