

EARTH & SPACE SCIENCE (ESS)

ESS 100 Earth Science

This course is a general survey of geology, meteorology, oceanography, and astronomy in the context of natural hazards and disasters. There is an emphasis on understanding, predicting, avoiding, and preventing these disasters. The course is intended for non-science majors interested in the earth sciences and how they relate to human activity.

Upon successful completion of this course, students should be able to:

Analyze efforts to minimize the effects of natural hazards.

Explore how scientific evaluation can assess the dangers posed by natural processes through observation and risk analysis.

Explain the underlying geologic and atmospheric processes responsible for natural hazards such as volcanic eruptions, earthquakes, floods, and hurricanes.

Identify areas susceptible to natural hazards and infer which hazards have the potential to become natural disasters or catastrophes as a result of geographic or anthropogenic factors.

Develop an appreciation of the significance of natural hazard events through the application of natural hazard case studies.

Demonstrate techniques for solving problems in a collaborative, technology-rich laboratory environment.

College Academic Learning Goal Designation: Scientific Reasoning (SI)

Prerequisites: (ENG 050 and REA 050) or ENG 099 or REA 075. Appropriate placement test scores may be accepted.

4 Credits 3 Weekly Lecture Hours

2 Weekly Lab Hours

ESS 102 Introduction to Astronomy

This course is designed to introduce students to the science of astronomy, its history, and its importance as an influence on our view of humankind. The course is intended for non-science majors. An optional laboratory course, ESS 103 Introduction to Astronomy Laboratory, is offered at night.

Upon successful completion of this course, students should be able to:

Describe the night sky, the model used to represent it, and the motions of the sun, moon, and planets across it.

Trace the history of astronomy and the individuals and ideas that have shaped our view of the universe.

Describe the form in which information from the universe reaches astronomers, how the information is created, the tools used in astronomy to gather it, the concepts used to analyze it, and how the information is used to classify and study stars such as the sun.

Describe the important properties of stars, the methods by which astronomers measure those properties, and discuss the theories relating to stellar birth and evolution.

Describe the general characteristics of the solar system, the theories about its origin, how those theories are supported by observational evidence, and how the planets compare with one another in terms of their physical characteristics.

Discuss the discovery and nature of the Milky Way Galaxy, the different types of galaxies, their creation, organization, distribution, and motions in space, and how galaxies are used to develop theories regarding the creation and evolution of the universe.

Discuss the possibility of life existing elsewhere in the universe, what is presently known about the origins of life and suitable places for life to exist, and describe the observational evidence for or against life in the universe.

Prerequisites: (ENG 050 and REA 050) or ENG 099 or REA 075. Appropriate placement test scores may be accepted.

3 Credits 3 Weekly Lecture Hours

ESS 103 Introduction to Astronomy Laboratory

This laboratory course introduces students to astronomical observations through the use of telescopes and star charts to study objects in the night sky. Practical indoor activities are designed to foster an understanding of how objects from great distances are studied from the earth. Observations of the night sky with telescopes and the unaided eye will be conducted. Students will explore the constellations, moon, planets, and other objects of our universe. The course is intended for non-science majors, and is an optional laboratory course to accompany ESS 102 Introduction to Astronomy.

Upon successful completion of this course, students should be able to:

Identify stars, planets and constellations using the star charts.

Demonstrate proper use of telescope by reference to star charts.

Locate stellar objects with a telescope by reference to star charts.

Observe, record and analyze data collected from students observations as well as from observations of astronomical observatories.

Describe the nightly and annual motions of the moon, stars and planets.

Locate current information in journals and astronomical literature in the library.

Demonstrate the use of computer information systems such as Internet to collect and study recent data on astronomical events.

Describe several ways in which astronomers measure distance to stars.

Develop skills that can be used in life-long learning to understand the composition of our universe.

Corequisites: ESS 102.

1 Credit

2 Weekly Lab Hours

ESS 105 Astronomy

This course is designed to introduce students to the science of astronomy, its history, and its importance as an influence on our view of humankind. Students will conduct astronomical observations using software, telescopes, and star charts to study objects in the night sky. Practical observational activities are designed to foster a conceptual understanding of how objects from great distances are studied from the earth. The course is intended for non-science majors.

Upon successful completion of this course, students should be able to:

Explain what tools and methods are used by astronomers to make observations and gather information about the universe.

Describe the contributions made by early astronomers, and how it led to the current view of our universe.

Demonstrate an understanding of the origins, structure, and evolution of our solar system, stars, galaxies and the universe.

Investigate the possibility of life existing elsewhere in the universe.

Use star charts and/or planetarium software to survey the night sky and discover various celestial objects.

Use problem solving techniques to analyze and interpret data from student observations and/or astronomical observatories.

College Academic Learning Goal Designation: Scientific Reasoning (SI)

Prerequisites: (ENG 050 and REA 050) or ENG 099 or REA 075. Appropriate placement test scores may be accepted.

4 Credits 3 Weekly Lecture Hours

2 Weekly Lab Hours

ESS 110 Physical Geology

This course is designed for Geology and Natural Science majors program although it will be appropriate for non-science majors as a laboratory science elective. This course, designed as a laboratory course provides a study of the Earth, its composition, structure and the processes that shape it. The course will consider the various aspects of geology including, earthquakes, volcanoes, surface and groundwater, rivers and streams, caves, landform development, plate tectonics, rocks, and minerals.

Upon successful completion of this course, students should be able to:

Identify volcanism, igneous activity, and the formation of igneous rocks.

Describe the processes of weathering, erosion, sedimentation and the formation of sedimentary rocks.

Explain the basic ideas of metamorphism and the formation of metamorphic rocks.

Define the mechanism and effects of earthquakes.

Summarize the theory of plate tectonics.

Apply the plate tectonic theory to mountain building, volcanism and earthquakes.

Compare surface water and groundwater and explain the role of each in the human environment.

Climate, glaciers, wind, and coastal processes.

Geologic time and rock correlation.

Describe the socioeconomic impact of geology.

College Academic Learning Goal Designation: Scientific Reasoning (SI)

Prerequisites: (REA 050 or ENG 099 or REA 075) and (MAT 050 or MAT 060).

Appropriate placement test scores may be accepted.

4 Credits 3 Weekly Lecture Hours

2 Weekly Lab Hours

ESS 112 Historical Geology

Historical Geology is the study of the Earth's origin and changing dynamics including the physical, chemical and biological processes. In a laboratory setting, students will explore the rock layers, fossil records and current geological processes. Student will gain an understanding of the interpretation of the Earth's Geologic history.

Upon successful completion of this course, students should be able to:

Discuss the concepts of geologic and apply to rock correlation.

Apply the concepts of stratigraphy as related to geologic time.

Describe the fundamental processes of sedimentary environments.

Understand the current thoughts of the origin and diversity of life.

Summarize the general theory of the evolution of flora and fauna.

Understand the Precambrian life and earth history.

Understand the late Paleozoic life and earth history.

Understand the Mesozoic life and earth history.

Understand the Cenozoic life and earth history.

Summarize the concepts and current thoughts of primate and human evolution.

Prerequisites: ESS 100 or ESS 110.

4 Credits 3 Weekly Lecture Hours

2 Weekly Lab Hours