

## NORTHWESTERN CONNECTICUT COMMUNITY COLLEGE COURSE SYLLABUS

**Course Title:** EARTH SCIENCE      **Course #:** EAS\* 102

**Course Description:** 3 semester hours (3 lecture hours): This three credit, non-laboratory science course provides an exploration of the basic processes that have formed and continue to form our planet. Included in the content is an astronomical history of the Earth, plate tectonics, earthquakes, volcanoes, mountain building, erosional forces, and movement of the plates (plate tectonics). Other topics are atmospheric processes and trends, the rock cycle, ocean basins, as well as ocean currents and their influence on global and regional climate. Finally, the geologic time scale and fossil evidence will be discussed.

**Pre-requisite/Co-requisite:** Placement into ENG\* 101 or consent of the instructor.

**Goals:** To provide the student with a basic understanding the study of Earth science; to help students grasp the scientific principles underlying the basic phenomena of Earth processes; to provide students with an understanding of the technologies associated with studying Earth processes.

**Outcomes (Lecture):** At the end of the course, students should be able to:

- Differentiate among the four major branches of Earth Science
- Compare and contrast the four systems of Earth.
- Discuss how Earth science affects your daily life.
- Summarize the methods, applications, and limitations of the scientific method.
- Explain current understandings about the origin of the universe, the Milky Way galaxy, and our solar system.
- Discuss the characteristics of different planets in our solar system.
- Explain current knowledge about objects in the universe and the ways in which we understand the scale and function of the universe.
- Describe the particles within atoms and the structure of atoms.
- Relate the number of valence electrons of an atom to its chemical properties.
- Describe isotopes of an atom.
- Describe the abundance of different elements in the Universe and on the Earth.
- Compare the three states of matter in terms of energy and properties.
- Describe the phase changes that take place as matter transitions from one state to another.
- Define a mineral, describe how minerals form, and compare/contrast the different mineral groups.
- Classify minerals according to their physical and chemical properties.
- Identify some common minerals and their varying uses.
- Summarize our current supply and needs, including the costs/benefits of conventional energy sources.
- Compare and contrast the different types of rocks and describe the rock cycle and how each type of rock forms.
- Distinguish between internal and external processes that continue the rock cycle.
- Describe the geologic time scale, including deep-time.
- Distinguish between relative and absolute-age dating techniques.
- Compare and contrast different types of fossils and how they are formed.
- Explain how fossils can be used to interpret the Earth's history.
- Identify some common minerals and their varying uses.

- Summarize our current supply and needs, including the costs/benefits of conventional energy sources.
- Identify and distinguish renewable and non-renewable resources.
- Compare and contrast latitude and longitude, and describe a position in terms of degrees, minutes, and seconds.
- Compare and contrast the different forms of radiation in the electromagnetic spectrum.
- Discuss how satellites and sonar are used to map Earth's surface and its oceans.
- Describe the Global Positioning System.
- Describe evidence for continental drift and explain the theory of plate tectonics.
- Compare and contrast the different types of plate boundaries.
- Explain paleomagnetism and its importance.
- Summarize how convection in the mantle is related to the movements of tectonic plates.
- Define stress and strain as they apply to the Earth's crust.
- Describe the three types of fault lines.
- Describe the properties of earthquakes and classify the three types of seismic waves.
- Compare and contrast earthquake magnitude and intensity and the scales used to measure each.
- Use data from seismic monitoring stations to determine the epicenter of an earthquake.
- Understand crust-mantle relationships in terms of isostatic rebound.
- Classify volcanoes and describe how volcanoes are formed.
- Differentiate among processes that form mountains.
- Compare and contrast weathering and erosion.
- Describe factors that affect the rate of weathering and erosion.
- Describe the formation of soil.
- Identify the factors that affect mass movements.
- Describe the conditions that will lead to wind erosion, and identify evidence of wind erosion.
- Explain how glaciers form and modify the landscape.
- Recognize glacial landscape features.
- Identify landscape features that are formed by surface water.
- Describe how surface water moves materials and impacts humans.
- Identify the origins of deserts and features of deserts.
- Discuss the origin and composition of the oceans.
- Describe the characteristics and variations in salinity ocean water.
- Compare and contrast various ocean currents, tides, wave formation, and wave/coastal interactions.
- Identify major biomes in the ocean and the types of marine life that live in them.
- Recognize the impact of human activity on the quality of groundwater, surface water, and ocean water.
- Identify human uses of water.
- Summarize the major biogeochemical cycles, including the hydrologic cycle, and how each is balanced over time in the hydrosphere, lithosphere, and atmosphere.
- Describe the composition and structure of the atmosphere, including layering.
- Describe the various properties of the atmosphere.
- Classify the types of clouds and the four main types of precipitation.
- Compare the types of energy transfer throughout the atmosphere.
- Compare and contrast weather and climate.
- Describe the tools to gather weather and climate data.
- Use basic meteorological tools to forecast weather.
- Describe the formation and movements of air masses.
- Define and identify methods to measure humidity, dew points, and wind speed.

- Describe long-term patterns in climate.
- Recognize the non-human reasons for past climate changes.
- Compare and contrast effects of modern climate change and explain possible solutions to the climate change problem.

**Evaluation:**

Mastery of outcomes will be evaluated through a mix of projects, writing assignments, discussions, and quizzes. Please see the Grading Criteria below for details.