Northwest Arkansas Community College

(Science and Mathematics Division)

Discipline Code
GEOL

Course Number
1134

Course Title
Environmental Geology

Catalog Description
The application of geological principles to problems created by human exploitation of the environment. Laboratory exercises concerning interaction of human populations with flooding, groundwater movement and contamination, erosion, earthquakes, waste disposal and landfills. GIS (Geographic Information Science) is used to facilitate student learning of most curriculum topics.

Prerequisites
GEOL 1114 General Geology I

Credit Hours
4 credit hours

Contact hours
45 lecture contact hours; 45 lab contact hours

Load hours
5 load hours

Semesters Offered
Fall, Spring

ACTS Equivalent
GEOL 1124 Environmental Geology

Grade Mode
A-F

Learning Outcomes
Students completing this course will:

- Display understanding into how the scientific method is applied to environmental issues
- Demonstrate through labs, exams, and projects a foundation in environmental geology prerequisite for higher level courses
- Identify underlying geological principles affecting environmental issues.

- Understand and analyze the effects of tectonic plate movement on natural hazards such as volcanoes, landslides, earthquakes, hurricanes, waves, and floods, and the effects of these hazards on humans and the environment.
- Describe the geologic factors affecting the use, supply, contamination, and treatment of surface and groundwater resources
- Identify the geological aspects of waste management and disposal
- Interpret and discuss issues surrounding several environmental case studies
- Recognize the relationships between humans and the environment, particularly the effects of population growth on natural systems including soil degradation and desertification.
- Define and explain Earth systems concepts relating to global change such as greenhouse gases and ozone balance.
- Demonstrate the ability to utilize Global Positioning Systems and GIS technology
- Discuss environmental effects of resource extraction and laws governing remediation of these effects.

General Education Outcomes Supported

- Students gain greater awareness of cultural perspectives.
- Students can use computers proficiently.
- Students develop higher order thinking skills.

Standard Practices

Topics:

- Earth systems and cycles
- Effects of population growth on the environment
- The Solid Earth (Rocks, Minerals, Plate Tectonics)
- Earthquakes, volcanoes, hurricanes, and waves' effects on human activity
- Soil erosion
- Atmosphere, weather, climate and their interaction
- Glaciation and Long-Term Climate Change
- Mass movement and subsidence
- Water and air pollution
- Streams, flooding, and wetlands
- Ozone balance and greenhouse effect
- Arid Lands, Winds, and Desertification
- Mineral and energy resources and environmental laws
- Waste management
- Scientific method/inquiry

Learning activities

- Courses must, at a minimum, cover the core learning outcomes for each topic. Faculty may add to these outcomes, but may not omit any of them.
- Laboratory exercises should average between 2-3 hours a week and include earth materials review, natural hazards, water supply and distribution, climate change, and waste management.
- Field trips to local waste management facilities are required when possible.

Assessments

- Students complete an exercise on earthquake comparison, which involves researching and compiling data, such as magnitude, depth, GDP and poverty rate, on Chile and Haiti and subsequently hypothesizing whether these factors affect death rates from recent quakes in the

countries. A rubric is used to determine whether students recognize the effect of a country's culture on susceptibility to natural hazards. Exercise is assigned as part of the module involving earthquake hazards.
- Students complete a GIS exercise on Floodplain Landuse Analysis, which involves folder navigation, saving, mouse proficiency, and menu navigation, as well as several ArcMap (GIS software) operations. A rubric is used to determine whether students are able to complete the tasks requiring the above computer skills. Exercise is assigned as part of the module involving flood hazards.
- Students complete a quiz composed of ten multiple-choice questions related to case studies addressed throughout the semester. Questions have been selected and approved by geology faculty and are administered as part of students' final exams.

Grading guidelines

- Lab activities/exams should comprise approximately 25% of the overall grade.

Revision Date

April 29, 2022