GEOL A165: NATURAL DISASTERS

Item	Value
Curriculum Committee Approval Date	12/08/2021
Top Code	191400 - Geology
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)

Course Description

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 discussion will focus on aspects of regional planning, environmental laws and the interaction between science and society. Transfer Credit: CSU; UC.

Course Level Student Learning Outcome(s)

1. The student will be able to employ basic Earth Science concepts to Natural Disasters and make logical decisions when dealing with processes such as earthquakes, volcanoes, hurricanes, landslides, and floods.
2. The student will be able to explain basic terms and concepts of related to the study of Natural Disasters.
3. The student will be able to discriminate between studies exhibiting good scientific process from those that do not.

Course Objectives

- 1. Understand and provide written examination of the topics covered in the course outline.
- 2. Identify and describe the various types of natural disasters
- 3. Apply concepts covered in course to evaluate potential problems worldwide
- 4. Understand the role of the scientist in influencing environmental policy
- 5. Recognize how human population and activities are interrelated to and affected by natural disasters.
- 6.
  Describe and analyze the relationships of population to natural disasters.
- 7.
  Evaluate the various sources of energy that are associated with natural disasters.
- 8.
  Identify the major types of plate boundaries, their associated faults, and their historic and potential future natural disasters.
- 9.
  Describe typical mitigations for natural disasters including fires, floods, landslides, volcanic eruptions, earthquakes, and severe weather.

Lecture Content

Introduction Scientific Thought scientific method multiple working hypothesis systematic questioning of hypothesis Human population Pollution centers vs disasters Population growth Earths carrying capacity Geology Basics Earths origin Minerals and rocks Plate tectonics Earths internal structur Boundary types Driving forces Geologic time Energy sources for disasters Internal heat engine Core heat Heat energy transfer External heat engine Sun Gravity Internal Processes Earthquakes Faults Dip-slip Strike-slip Oblique-slip Elastic Rebound Theory Plate boundaries vs. earthquakes Case studies Volcanoes Volcanic landforms Shield Cinder Stratovolcano Plate boundaries vs. volcanoes Case studies External Processes Landslides and mass wasting Style: Slide, Flow, and Topple Causes Triggers Case Studies Flooding Stream Discharge Erosion Deposition Factors contributing to floods Tsunamis Causes Earthquakes Landslides Volcanoes Extraterrestial Energy propagation Factors influencing wave height Case study Hurricanes and tornadoes Physical properties of water Driving force for wind Hurricane and tornado categories Types of damage Case study I> Extinctions Major events Ordovician Devonian Permian/Triassic Triassic Cretaceous/Tertiary Internal sources Plate motion Volcanism Disease Predators Climatic changes External sources Asteroid/meteor impacts Changes in solar energy Supernovas

Method(s) of Instruction

- Lecture (02)

Instructional Techniques

Course type: scheduled lecture hours Demonstration Observation Practicum Lecture using chalkboard, transparencies, photographic slides, models, videos, computer simulations, and computer assisted projections. Discussion sessions in which small groups relate personal observations and individual research to form group conclusions. Field trips (virtual or in person) to environmental problem areas. Reading and discussion of important earth science issues from pertinent scientific journals. Small groups exercises designed to explore particular topics in greater detail. Web-based research of selected earth science topics.

Reading Assignments

Students will spend approximately two hours per week on readings assigned from textbook(s)

Writing Assignments

Students will spend approximately two hours per week on the following: Exercises requiring interpretations and conclusions based on local geologic conditions Analyze home and neighborhood for natural disaster potential, and synthesis of appropriate emergency procedure plans.

Out-of-class Assignments

Students will spend approxiamtely two hours per week on homework including textbook exercises, arguments and analysis of current newspaper, or periodical articles about Natural Disaster processes for scientific accuracy and relevance. Short written answers evaluating Natural Disaster topics. Possible field trips to pertinent areas.

Demonstration of Critical Thinking

Essay questions that focus on the application and the integration of knowledge acquired from lecture. Exercises requiring interpretations and conclusions based on local geologic conditions Analyze home and

neighborhood for natural disaster potential, and synthesis of appropriate emergency procedure plans.

Required Writing, Problem Solving, Skills Demonstration

Essay questions on quizzes and exams Exercise write-ups Field project reports

Eligible Disciplines

Earth science: Masters degree in geology, geophysics, earth sciences, meteorology, oceanography, or paleontology OR bachelors degree in geology AND masters degree in geography, physics, or geochemistry OR the equivalent. Masters degree required.

Textbooks Resources

1. Required Abbott, Pat.. Natural Disasters, 9th ed. Dubuque: McGraw-Hill, 2013