GEOL 110 – INTRODUCTION TO GEOLOGY | 4 CREDITS

SYLLABUS

CATALOG DESCRIPTION

A study of the composition and structure of the earth, including plate tectonics, minerals, the rock cycle, mountain building, energy resources, and natural hazards such as volcanoes, earthquakes, and landslides. This class includes optional weekend field trips.

Prerequisites: None

Semester Offered: Fall and Spring

Common Student Learning Outcomes

Upon successful completion of San Juan College programs and degrees, the student will demonstrate competency in…

BROAD AND SPECIALIZED LEARNING

Students will actively and independently acquire, apply, and adapt skills and knowledge with an awareness of global contexts.

CRITICAL THINKING

Students will think analytically and creatively to explore ideas, make connections, draw conclusions and solve problems.

CULTURAL AND CIVIC ENGAGEMENT

Students will act purposefully, reflectively, and ethically in diverse and complex environments.

EFFECTIVE COMMUNICATION

Students will exchange ideas and information with clarity in multiple contexts.

INFORMATION LITERACY

Students will be able to recognize when information is needed and have the ability to locate, evaluate, and use it effectively.

INTEGRATING TECHNOLOGIES

Students will demonstrate fluency in the application and use of technologies in multiple contexts.

Student work from this class may be randomly selected and used anonymously for assessment of course, program, and/or institutional learning outcomes. For more information, please refer to the Dean of the appropriate School.

Course Learning Outcomes

Upon successful completion of the course, the student will be able to…

1. explain the concept of plate tectonics, including types of plate boundaries, the characteristics of those boundaries (including surface expression), the driving forces of plate tectonics, and the unresolved issues;
2. describe the difference between continental and oceanic crust and major characteristics of each;
3. describe hot spots and locate at least two;
4. compare and contrast the compositional and physical divisions of the earth and discuss the causes for these divisions;
5. describe how magnetic reversals supports the concept of plate tectonics;

6. interpret the distribution of earthquakes and volcanoes and discuss the risks and hazards associated with each;
7. explain the occurrence of tsunamis;
8. name the most abundant elements and minerals in the earth;
9. demonstrate how atomic structure can determine mineral properties such as hardness, cleavage, density, and color;
10. define a mineral, and discuss the differences between a rock and a mineral;
11. draw and describe the rock cycle, including rock types and processes;
12. define igneous, metamorphic, and sedimentary rocks and give several examples of each;
13. describe how igneous, metamorphic, and sedimentary rocks are classified using texture and composition, and other appropriate terminology;
14. explain the origins of different types of magmas;
15. distinguish between intrusive and extrusive igneous rocks;
16. describe the differences between mechanical and chemical weathering, and illustrate how each process contributes to erosion;
17. label major soil horizons and list their characteristics;
18. describe how soils develop according to the climate and local rock type;
19. describe different types of mass wasting, controls and triggers, and the hazards associated with each;
20. distinguish between clastic, chemical, and biochemical sedimentary rocks;
21. determine a possible source, transport, and depositional environment for a sedimentary rock based on composition, sedimentary structures, and fossils;
22. explain the differences between regional, contact, and hydrothermal metamorphism;
23. explain the formation of and how to identify metamorphic textures;
24. identify and draw conclusions about the origins of rocks and minerals based using texture, composition, and other observations;
25. differentiate relative and absolute ages, and use established methods to determine both;
26. define and utilize the principles of uniformitarianism, original horizontality, cross-cutting relationships, superposition, and fossil succession;
27. define formation, contact, and unconformity and describe the importance of these concepts;
28. read and use a topographic map;
29. classify features of a river system including tributaries, main stem, terraces, base level, competence, capacity, meanders, point bars, cutbanks, oxbow lakes, levees, and incised meanders;
30. understand the concept of stream flooding, and why it is so devastating to humans;
31. describe how climate and sea level interact;
32. define groundwater and describe how it can become contaminated;
33. list features of a good aquifer;
34. define brittle and ductile deformation and describe what influences which type of deformation occurs in rocks in the earth's crust;
35. describe normal, reverse (thrust), and transform faults, and give modern examples of each;
36. identify major mountain belts around the world and interpret their formation;
37. describe the formation of geologic resources such as oil, coal, precious metals, and gemstones;
38. connect the rock cycle with other processes (such as the water cycle, climate patterns, ocean circulation, soil formation) using a modern example ;
39. apply knowledge gained in the course to current scientific and environmental issues.