

## CE 20500 Engineering Geology – SP2012

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**Textbook:** Geology for Engineers & Environmental Scientists, 3<sup>rd</sup> edition, by Alan Kehew

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**Grades:**

Assignments:	20% (includes pop quizzes)
Term Exam -1 (Feb. 16 <sup>th</sup> ):	20%
Term Exam -2 (March 29 <sup>th</sup> ):	20%
Term Paper (ABET accred.):	10%
Final (May 9 <sup>th</sup> , 2012):	30%

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### Course Description:

A study of physical geology and geologic processes relevant to engineering. Emphasis is on origin and distribution of natural hazards (earthquakes, volcanoes, floods, mass wasting) as they impact built infrastructure, and chemical and physical processes impacting contaminant transport in water. Distribution of natural hazards is considered in the context of Plate Tectonics theory.

**Course website:** <http://www.nd.edu/~asimonet/CE20500.html>

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### Course Outline and Corresponding Chapters in Textbook

- ▶ Introduction
- ▶ Origin of the Solar System, Earth, and the Hydrosphere (Chapter 2)
- ▶ Internal structure of the Earth
- ▶ Mineralogy (Chapter 3):
  - Physical properties of minerals
  - Crystal chemistry and structure
  - The rock-forming minerals
  - Minerals important to engineering

- ▶ Igneous Rocks and Volcanic Activity (Chapter 4):
  - Types of igneous rocks
  - Types of volcanic eruptions
  - Hazards posed by volcanoes
  - Impact of volcanism on engineering
- ▶ Sedimentary Rocks (Chapter 5):
  - Types of sedimentary rocks
  - Introduction to stratigraphy
  - Fossil fuels
  - Importance of sedimentary rocks on engineering
- ▶ Metamorphic Rocks and Rock Deformation (Chapter 6):
  - Types of metamorphic rocks
  - Rock mechanics (deformation of rocks and minerals)
  - Introduction to structural geology
  - Impact of tectonic deformation on engineering
- ▶ Weathering and Soils (Chapter 9):
  - Types of weathering mechanisms
  - Formation of soils
  - Mass wasting
  - Impact of weathering and erosion on engineering
- ▶ Seismology and Earthquakes (Chapter 8):
  - Origin of earthquakes and brittle deformation of the crust
  - Types of propagation of seismic waves
  - Distribution of earthquakes
  - Predicting earthquakes
  - Impact of earthquakes on engineering
- ▶ Plate Tectonics (Chapter 2):
  - Evidence for plate tectonics
  - Seafloor spreading and continental drift
  - Distribution of plates and plate boundaries
  - Ramifications for understanding earthquakes, volcanoes, and crustal deformation
- ▶ Hydrologic Cycle (Chapters 11, 14):
  - Rivers, streams, lakes, oceans, and groundwater
  - Drainage basins
  - Distribution and movement of groundwater
  - Aquifers
  - Groundwater and engineering infrastructure
- ▶ Subsurface Contamination and Remediation (Chapter 12):
  - Sources of contamination
  - Transport of contaminants
  - Remediation tactics
  - Impact of subsurface contamination on engineering
- ▶ Global Climate Change (Chapter 1)