

GEOGRAPHY AND PLANNING

GPHY 317: Soil, Environment, and Society



Contact Time	Two 1.5 hr lectures, one 3hr lab every other week, one-day field trip
Format	Lectures, discussions, laboratory assignments, one-day field trip
Class assessment	Mid Term: 20% Lab Reports: 50% (30% for first 5 reports, 20% for final report) Final Exam: 25% Class participation: 5%

COURSE OVERVIEW

While occupying only a very thin layer, soils are a critical resource that societies require to survive. Yet human activities often degrade soils to the point that they can no longer provide the critical services that society requires. While soil formation processes can help regenerate soils, these processes occur over very long time scales. Soil characteristics are determined by the interactions between physical, biological, and chemical processes. This course will take a very hands-on approach to learning the concepts and methods needed to characterize key biological, chemical, and physical characteristics of soils. We will explore the measurement of key soil properties, including chemical, biological, and physical properties. Then, we will explore the realm of soil formation, how soils are distributed in space compared to factors such as climate, and how it influences soil taxonomy and the distribution of vegetation. Finally, we will explore key soil-related issues facing society today, including soil salinization, soil degradation from agriculture, climate change, and soil erosion. At the end of the course, students will have a strong understanding of the dynamic nature of soils, how soil processes change over various spatial and temporal scales, and their critical role in the earth system.

LEARNING OUTCOMES

- Understand how soils influence society
- Ability to measure key soil properties
- Understand how the interactions between soil properties (e.g. physical and biological) influence soil 'function'
- Benefits of healthy soil to society

COURSE TOPICS

Soil physical, chemical, and biological properties; soil genesis and classification; soil degradation (acidification, sodification, salinization; soil erosion). Interactions between soil quality and benefits to society.

SELECTED COURSE TEXTS & READINGS

- Diamond, J. 2005. *COLLAPSE: How Societies Chose to Fail or Succeed*. Penguin Books, London, England.
- Gardiner, D.T. and R.W. Miller. Eleventh Edition. 2008. *Soils in our Environment*. Pearson/Prentice Hall (provided as a course pack).
- Supplemental Reading:
- Brady, Nyle C., and R.R. Weil. 2009. *Elements of the Nature and Properties of Soil*. Pearson/Prentice Hall.