

Introduction to Soil Science

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Instructor: Dr. Evert Elzinga, Department of Earth & Environmental Sciences, 139 Smith Hall
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Lecture: Tuesday and Thursday 2:30 am – 5:20 pm

Location: Smith Hall room 127

Office hours: *by appointment (set through email)*

Prerequisites: Planet Earth **and** Chemistry I (lecture + lab)

Course Description:

This course explores the fundamental principles of soil science and soils as a natural resource. Students will be introduced to the physics, chemistry, microbiology, morphology, fertility and management of soils, and to the processes driving soil formation. The major soil types of the world and their classification will be discussed, and the relation of major soil characteristics to soil productivity, conservation and sustainability will be addressed. Students will be introduced to the role of soils in food production, carbon sequestration, groundwater quality and the processing and cycling of nutrients and contaminants. The lab part of the course provides hands-on practical measurements and exercises of the concepts discussed during lecture

Learning outcomes:

Upon completion of the course, students are expected to:

- be familiar with the major soils of the world and their classification, and the processes leading to their formation and properties
- understand and define the physical, chemical, and biological processes that operate in soils
- be familiar with the factors influencing carbon, nutrient and contaminant cycling within terrestrial ecosystems
- have an appreciation for soils as a dynamic, non-renewable natural resource

Study Materials:

- (1) *The Nature and Properties of Soils 14th ed.*, by N.C. Brady and R.R. Weil, Prentice Hall, Inc.
- (2) Lecture notes
- (3) Handouts
- (4) Lab exercises

Homework, exams and grading:

There will be a total of 6-8 Lab reports during the course, in addition to two midterms and a final exam. Performance on lab assignments and the lab reports will account for 40% of the final grade; the midterms and final will count for the remaining 60% (i.e. 20% each). The midterms and final exams will be in-class and non-cumulative.

Schedule*

Week	Subject	Study Material
1	Introduction	Chapter 1
2	Soil formation	Chapter 2
3	Soil physical properties and architecture	Chapter 4
4	Soils and the Hydrologic Cycle	Chapters 5 and 6
5	Soil chemistry, mineralogy, and acidity	Chapter 8, 9
6	Midterm 1	
7	Soil biology: Organisms and ecology	Chapter 11
8	Soil organic matter	Chapter 12
9	Wetland soils, Oxic soils and Arid Soils	Chapter 7
10	Soil classification	Chapter 3
11	Midterm 2	
12	Soil use and degradation	Chapter 17, 18
13	Soil nutrients and management	Chapters 13-16
14	Soils and climate change	Chapter 20

**This schedule is tentative and will likely be subject to change.*