

# Environmental Soil (Geo)chemistry

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Spring 2015

## Instructors:

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Lecture: Wednesday 6-9 pm

Location: 127 Smith Hall

Office hours: open door

Prerequisites: General Chemistry, (Geochemistry)

## Course Objective:

Upon completion of the course the students will be able to identify the soil components and properties responsible for the chemical reactivity of soils, and comprehend the fundamental chemical processes that occur in soils. The students will also be able to link theoretical concepts to environmental problems.

## Study Materials:

1. *Environmental Soil Chemistry*, Donald L. Sparks, Academic Press, Second Edition, 2003.
2. Lecture notes (pdf files of lecture slides will be provided)
3. Handouts

Other textbooks of interest (not required):

*Environmental Chemistry of Soils*, Murray B. McBride, Oxford University Press, 1994.

*Soil and Water Chemistry. An Integrative Approach*, Michael E. Essington, CRC Press, 2004.

*The Chemistry of Soils*, Garrison Sposito, Oxford University Press, 1989

## Homework, Exams and Grading:

There will be a total of 5 (five) homework sets during the course, and one take-home problem set. In addition, there will be a midterm and a final exam, which will both be take-home. The various scores will be weighed as follows to determine the final grade:

Homework (5 sets, 6% each): 30%

Take-home problem set: 10%

Midterm: 30%

Final: 30%

*Exams:* Although exams are not cumulative, be aware that the subjects covered build upon themselves so that you need to know the earlier material in order to understand the material covered later in the class. There will be no make-up exams, except in cases where arrangements were made before the exam is given.

*Homework:* Homework assignments will be given based on topics discussed in class. Homework sets will be handed out at the end of the lecture (see dates indicated in the schedule) and will be due at the start of the next lecture

*Grading Formula:* Specific grades are as follows:  $\geq 90.0\%$  = A; 89.9–80.0 % = B; 79.9-70.0 % = C.

Class Schedule\*:

<b>Date</b>	<b>Subject</b>	<b>Study Material</b>	
21-Jan	Introduction; Chemical review	Sparks Chapter 1, p.1-28	HW1
28-Jan	Inorganic Soil Components	Sparks Chapter 2	
4-Feb	Soil Organic Matter	Sparks Chapter 3 (skip p.101-109)	
11-Feb	Soil Solution Phase	Sparks p.101-109, and p. 101-126	HW2
18-Feb	Sorption	Sparks p.127-185	
25-Feb	Sorption	Sparks p.127-185	HW3
4-Mar	Kinetics	Sparks Chapter 7	
11-Mar	<b>Midterm Exam</b>	Lectures 1 through 7	
18-Mar	<b>Spring Break</b>	-	
25-Mar	<b>take-home problem set</b>		
1-Apr	Soil Redox chemistry	Sparks Chapter 8 & Handouts	HW4
8-Apr	Soil colloids	Handouts	
15-Apr	Heavy metals	Handouts	HW5
22-Apr	Soil Acidity	Sparks Chapter 9	
29-Apr	<b>Final</b>	Lectures 8 through 12	

\*Note that the schedule may be subject to change; you'll be informed of any changes