

# ENVS 410/510: Soils (4 cr)

**Instructor:** *Scott Bridgham*

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**Office Hours:** By appointment. I enjoy interacting with students, and feel welcome to talk with me. I generally am available before and after class, during class breaks, and by appointment. I don't have official office hours because students rarely come during those prescribed times, but please don't interpret that as meaning that I don't want to meet with you.

**GTF:** Cris Piccioni

47C Columbia, [cpiccioni@uoregon.edu](mailto:cpiccioni@uoregon.edu), 346-5003

**Office Hours:** Monday 9:00 – 11:00

**Texts:** *Elements of the Nature and Property of Soils*, 3<sup>rd</sup> edition. (2010) Nyle C. Brady and Ray R. Weil, Prentice Hall.

*Dirt: The Erosions of Civilization*. 2007. David R. Montgomery, University of California Press.

See companion website: <http://www.prenhall.com/brady/>

**Lecture:** T,R 14:00-15:20 COL 142, Lab R 15:30-17:20 COL 142

**Prerequisites:** General Chemistry (Chem 221-223 or equivalent)

## Course Description

This course will introduce you to the wonderful world of soils that lie, often forgotten, beneath your feet every day. Soils are one of the most fundamental ecological constraints on such things as plant distributions and the productivity of both natural and managed ecosystems. Soils are also an important component of many of today's (and history's) most pressing environmental problems.

For Environmental Science majors, this course satisfies an upper division elective (Area 3A) in natural sciences. It is also widely applicable to graduate and undergraduate students in Biology, Geography, Geology, Anthropology, and Landscape Architecture, along with other majors on campus.

The course involves a mixture of lecture and experiencing soils first hand in the lab and field. Scheduled are two 80 minute lectures per week, one 2-hour lab per week, and a weekend day trip. The lab is scheduled immediately after class in the late afternoon, and we will use this entire block of time occasionally to sample soils in local field sites.

## Course Objectives:

The objectives of this class are to have students:

- learn the physical, chemical, and biological aspects of soils,
- learn field identification of important physical soil attributes and become familiar with the U.S. classification scheme for soils,
- form a basic understanding of the causes for the formation of different soils in the landscape, and
- gain an appreciation for the fundamental role that soils play in many environmental problems and the limits that soil degradation places on society.

The classroom portion of this class is lecture based delivered at a relatively rapid pace via PowerPoint. Detailed PowerPoint slides will be put on Blackboard at least 24 hours before lecture. I will also print them and give them as handouts before every lecture.

**Attendance** is required for lecture, lab, and field trips. Three unexcused absences from lecture or lab within a term will result in your grade being reduced by one-third letter grade, and each additional unexcused absence will result in a similar reduction your grade. *You will need to drop the class if you cannot make the weekend field trip.*

### **Grading Criteria**

Students will be evaluated based upon attendance, a midterm, a final, two comprehensive lab reports, and an essay on *Dirt: The Erosions of Civilization*. The final exam will cover material since the previous test and is NOT comprehensive.

### **Grade Distribution**

Midterm 1	25%
Final	25%
Labs	35%
Essay	15%
	<u>100%</u>

### **Early Final Examinations (Quoted from UO website)**

Final examinations must be given during the scheduled final examination period. Faculty legislation prohibits the early administration of final examinations. Final examination week is considered to be a part of the regular term, and to end the term prior to its scheduled date reduces instructional days to which students are entitled.

### **Labs and Field Trips**

Promoting hands-on learning about soils by students is an important component of this class. We'll occasionally use some or all of the lecture time on Thursdays for labs and field trips. Labs will be used to do an extensive physical description of the soil horizons from each field site. A comprehensive lab report will be due in two parts. The first part will describe the horizons and the landscape setting of soils sampled up to that point. It will also include a soil map of each site downloaded from the soil mapper program on the Natural Resources Conservation Service website. The second part will include the same for the remainder of the soils sampled along with an overall assessment of how the five state factors introduced in class describe the distribution of soils within this part of

Oregon. Students will work in teams in the lab and may share data, but *ALL writing must be their own for the lab reports*. Field trips happen irrespective of the weather and will involve digging in the soils, so bring appropriate clothing and shoes. We may also occasionally get back after the 5:20 end of lab during field trips.

***There is a mandatory field trip on Saturday, Oct. 22nd. Place this on your calendars now.***

### **Academic Dishonesty and Other Matters**

You are expected to follow University rules and guidelines for behavior. *Academic dishonesty*, which includes cheating and plagiarism, is a serious offense and will be treated according to the guidelines in the Student Conduct Code (see Office of Student Life website).

*Plagiarism is the inclusion of someone else's product, words, ideas, or data as one's own work. When a student submits work for credit that includes the product, words, ideas, or data of others, the source must be acknowledged by the use of complete, accurate, and specific references, such as footnotes. Expectations may vary slightly among disciplines. By placing one's name on work submitted for credit, the student certifies the originality of all work not otherwise identified by appropriate acknowledgements. On written assignments, if verbatim statements are included, the statements must be enclosed by quotation marks or set off from regular text as indented extracts.*

*A student will avoid being charged with plagiarism if there is an acknowledgement of indebtedness. Indebtedness must be acknowledged whenever:*

- 1. one quotes another person's actual words or replicates all or part of another's product;*
- 2. one uses another person's ideas, opinions, work, data, or theories, even if they are completely paraphrased in one's own words;*
- 3. one borrows facts, statistics, or other illustrative materials--unless the information is common knowledge. (UO Policy on Academic Dishonesty, <http://tep.uoregon.edu/workshops/teachertraining/learnercentered/syllabus/academicdishonesty.html>)*

**Crises** happen. If you are having problems that are interfering with your ability to do the work in this class, please let me know promptly. I am willing to make special arrangements when the need is real and when you have done your best to deal with the situation in a timely manner.

**Disabilities:** The University of Oregon is working to create inclusive learning environments. Please notify me if there are aspects of the instruction or design of this course that result in barriers to your participation. You may also wish to contact Disability Services in 164 Oregon Hall at 346-1155 or [disabsrv@uoregon.edu](mailto:disabsrv@uoregon.edu).

### **Useful Web Links**

- Glossary of soil science terms: <https://www.soils.org/publications/soils-glossary>
- Soil taxonomy in the U.S., keys and maps: <http://soils.usda.gov/technical/classification/taxonomy/>

- Description and distribution maps of soil orders:  
<http://soils.cals.uidaho.edu/soilorders/index.htm>
- Official soil series descriptions:  
<http://soils.usda.gov/technical/classification/osd/index.html>
- Natural Resources Conservation Service homepage: <http://www.nrcs.usda.gov/>
- Soil Science Society of America: <https://www.soils.org/> (Professional society of 6,000+ members whose goal is to advance soil science.)
- Soil biological communities, informative website about the abundant life in soil, run by National Science and Technology Center and Bureau of Land Management: <http://www.blm.gov/nstc/soil/index.html>
- Pedosphere.com is an extensive repository of soil science knowledge through partnerships with major international organizations and also be an active player in global Soil Science education by creating high quality, interactive resources that engage both students and instructors: <http://www.pedosphere.com/>
- Smithsonian Soil Exhibit: <http://www.soils.org/smithsonian/>
- Soil Science Education: <http://soil.gsfc.nasa.gov/>
- International Union of Soil Scientists: <http://www.iuss.org/>
- World Soil Resources <http://soils.usda.gov/use/worldsoils/>

## Syllabus

<b>Week</b>	<b>Date</b>	<b>Lecture</b>	<b>Text Reading*</b>	<b>Notes</b>
1	9/27	The Wonderful World of Soils	Ch. 1	
1	9/29	Physical Properties	Ch. 4	No lab
2	10/4	Physical Properties		
	10/6			Lab: Introduction to field description of soils
2		Soil Formation (Pedogenesis)	Ch. 2	
3	10/11	Soil Formation (Pedogenesis)		
	10/13	<b>Local Field Trip During Class and Lab Time</b>		
3				
4	10/18	Soil Formation (Pedogenesis)		
4	10/20	Soil Classification	Ch. 3	Normal lab
	10/22	<b>MANDATORY WEEKEND FIELD TRIP</b>		
4				
	10/25	Soil Classification (Chefs movie from Dig It)		
5				
5	10/27	<b>Mid-Term</b>		Normal lab
6	11/1	Soil Classification		
	11/3	<b>Local Field Trip During Class and Lab Time</b>		
6				
7	11/8	Soil Water	Ch. 5-7	
	11/10			Normal lab, <b>First Part of Lab Report Due</b>
7		Soil Water		
8	11/15	Colloidal Fraction	Ch. 8	
8	11/17	Colloidal Fraction		Normal lab
9	11/22	Soil Acidity, Alkalinity, & Salinity	Ch. 9	
9	11/24	Thanksgiving—Happy Feasting!		
10	11/29	Soil Erosion	Ch. 14	
		Discussion of Dirt: the Erosion of Civilizations by Montgomery, movie: <a href="http://oregonstate.edu/media/vdltl">http://oregonstate.edu/media/vdltl</a>		<b>5 pg. essay due on reading, Last Part of Lab Report Due</b>
10	12/1			
	12/6	<b>Final, 13:00</b>		
		Field trips happen no matter the weather, so be prepared!		
		*From Brady and Neil unless otherwise noted.		