



- Instructor:** Lucas Silva, lsilva7@uoregon.edu
Office Hours: 12 to 1 pm on Tuesdays (Col 248)
- GEs:** Schyler Reis, schylerr@uoregon.edu
Office Hours: 12 to 1 am on Tuesdays (Col 246)
- Jamie Wright, jwright12@uoregon.edu
Office Hours: 12 to 1 pm on Thursdays (Onyx 287)
- Lecture:** 2:00 - 3:50 pm Tuesday. Room 142 Columbia Hall
- Lab:** (A) 2:00 - 3:20 pm Thursday. Room 142 Columbia Hall
(B) 3:30 - 4:50 pm Thursday. Room 142 Columbia Hall
- Field Trip:** Field trip week zero September 25th to 27th
Depart 25th 12:30 pm Onyx Bridge Parking Lot, Return 27th 4:00 pm
Unload samples 4-5 pm
- Saturday October 12th
Depart 9:00 am Onyx Bridge Parking Lot, Return same day 4:00 PM
Unload samples 4-5 pm
- Website:** <https://canvas.uoregon.edu/courses/119639>

Texts and Additional Reading

- *Elements of the Nature and Property of Soils* 3rd edition (2010) Nyle C. Brady and Ray R. Weil, Prentice Hall (any edition). Several copies are available at the Science Library and two copies are reserved at the ENVS office. Also, check on line for affordable new or used copies online. The 2nd edition of the book is also acceptable, if you can find used copies.
- *Manual for Judging Oregon Soils* (see attached PDF on Canvas)
- Additional Reading will be assigned via Canvas.

Course Description

This course will introduce undergraduate and graduate students to the wonderful world of soils. Focus will be placed on the scientific study on soils and their relationship with fundamental processes that govern the functioning of natural and managed ecosystems. 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 Anthropology, Biology, Earth Sciences, Geography, and Landscape Architecture, along with other majors on campus. This course is open to undergraduate juniors and seniors who have completed a general chemistry sequence (CHEM 221-223, 224-226H or equivalent).

Learning Outcomes

Upon successful completion of this course, you should:

- Understand basic physical, chemical, and biological aspects of soils;
- Be able to describe important soil characteristics in field and laboratory settings;
- Be familiar with the USDA soil taxonomic system and able to understand the mechanisms of soil formation (pedogenesis) across varying landscapes;
- Recognize the fundamental role soils play in local and global environmental problems, and paradigms for managing essential soil ecosystem functions such and carbon and nutrient cycling;

Soil Science (ENVS 477/577) Fall 2019

Course Format

The course involves a mixture of lecture and first-hand soil examination in lab and field settings, including approximately 2-hour lectures per week, 1.5-hour lab activities per week, and one weekend day field trip. The classroom portion will be primarily lecture-based delivered at a relatively rapid pace via PowerPoint (slides will be available on Canvas) and should be supplemented by the assigned readings. We will begin the course with the fundamentals of soil science, apply this knowledge to define and characterize properties of important soil types, and then address complex environmental problems pertinent to soil science. Please ask questions during lecture if a concept is unclear. Occasionally, you will also have primary literature assigned that will be discussed during class time. This is a chance to enhance your critical thinking skills by interacting with the primary literature, your colleagues, and the instructor. Additionally, you will complete weekly assignments about fundamental concepts in soil science that will give you another chance to exercise your critical thinking and writing skills.

TENTATIVE SCHEDULE

Week	Date	Lectures/Labs/Exams	Reading	Notes
0	25-27 Sept	1st Field Trip		Lucas Silva + GEs
1	1-Oct	The Wonderful World of Soils	Ch. 1*	Lucas Silva
1	3-Oct	Lab 1		Qualitative description of color and texture** GE- Reis
2	8-Oct	Interpreting Physical Properties	Ch. 4*	Lucas Silva
2	10-Oct	Lab 2		Quantitative hydrometer (make your soil) texture** GE- Wright
-	12-Oct	2nd Field Trip		Lucas Silva
3	15-Oct	Soil Formation (Pedogenesis)	Ch. 2*	Lucas Silva
3	17-Oct	Lab 3		Comparison of soil orders from field collections** GE- Reis
4	22-Oct	Soil Formation & Classification	Ch. 3*	Lucas Silva
4	24-Oct	Lab 4		Web Survey / NRCS / Soil Web GE- Wright
5	29-Oct	Review Session / Discussion of Group Assignment		GE- Wright
5	31-Oct	Midterm 1		NO LAB
6	5-Nov	Soil Water	Ch. 5-7*	
6	7-Nov	Lab 5		Infiltration GE- Reis + Wright
7	12-Nov	Soil Chemistry	Ch. 8*	
7	14-Nov	Lab 6		Soil chemistry / pH GE- Reis + Wright
8	19-Nov	Biological Carbon & Nutrient Cycling	Ch 12/14*	
8	21-Nov	Lab 7		Loss on ignition GE- Reis + Wright
9	26-Nov	Review Session / Discussion of Group Assignment		GE- Reis
9	28-Nov	Thanksgiving		
10	3-Dec	Group Presentations		
10	5-Dec	Group Presentations		
11	9-13 Dec	Final		

*From Brady and Weil, other reading will be posted to Canvas.

** Manual for Judging Oregon Soils & pp. 103, 124 of Brady and Weil.

Labs and Field Trips

Labs will be used to examine soil from previously selected field sites and to provide hands-on opportunities to interact with course material. Lab and field guides will be posted on Canvas. You are expected to have read through the guide for that day and completed any pre-lab/field assignments detailed in the guide. Students will work in teams in the lab and may share data, but **all writing must be their own for the lab reports**. There is **one mandatory field trip (either on week zero or on Saturday, Oct 12th)**. Field trips happen irrespective of the weather and will involve digging in the soils, so bring appropriate clothing and shoes.

Important: Individual lab reports are due on Wednesdays of the week following lab activities in the GEs' mail box in the ENVS main office. Course schedule is subject to change. Any changes will be announced in advance during class and on Canvas.

Group presentations

Graduate students will be expected to lead group presentations focusing on tangible research projects developed using data from recently published soil science papers, and materials discussed in the classroom or in the lab / field.

Undergraduate students will be expected to present group projects focusing on topics related to course lectures or recent issues in soil science.

Example o relevant topics: In previous years, student presentations used recent scientific papers to support or critique one or more chapters of the textbook. *Dirt: The Erosion of Civilizations*. (2007) by David R. Montgomery, Univ. of California Press. Several copies of the book are available at the library and one copy is reserved at the ENVS office. It provides examples of relevant themes that are likely to inspire productive discussions within groups and among different groups of students.

Grading Criteria

There will be no grade down for missed lectures, but active participation and discussion during lectures will greatly enhance your learning experience. Students are expected to attend all labs and field trips and grades might be increased by up to half a letter for exemplary participation. **You are responsible for class-related work missed as a result of an absence** - this work may be made up at the instructor's discretion. All students will be evaluated based upon participation and lab reports, one field report, two non-cumulative midterms, biweekly chapter summaries and a final essay on *Dirt: The Erosion of Civilizations*. **10% will be deducted each day an assignment is late.**

Evaluation of performance will be based on course activities in the following proportions:

ENVS 477/577*		***
Participation –	10%	A+ = > 97%, A = 92.5 – 97%
Lab / Field Reports –	30%**	A- = 89.5 – 92.5%, B+ = 87.0 – 89.5%,
Mid-term exam –	22.5%	B = 83.0 – 87.0%, B- = 79.5 – 83.0%
Final exam –	22.5%	C+ = 77.0 – 79.5%, C = 73.0 – 77%
Group presentations –	15%	C- = 69.5 – 73.0%, D = 59.5 – 69.5%

*In addition to the assignments described above **graduate students will be evaluated** based on research projects developed with help of undergraduate students throughout the course and presented on Nov 27th

Participation in soil science project development and group presentation is **mandatory for all students

***Graduate students and non-major undergraduate students will be given the option of taking this course as pass / no pass

Crises happen. If you are having problems that are interfering with your ability to do the work in this class, let the instructor know as soon as possible. Special arrangements can be made when the need arises if you have done your best to deal with the situation in a timely manner.

Academic integrity and Diversity

All students are expected to complete assignments and exams in a manner consistent with academic integrity. This means that **you must produce original work and cite all relevant sources for ideas, quotations, etc.** Academic dishonesty is a serious offense and will be treated according to the guidelines in the Student Conduct Code. Moreover, I expect students to adhere to the University's commitment to freedom of thought and expression of all its members by encouraging open inquiry and respecting a diversity of opinions in this course. Please refer to the Student Conduct Code for more information on the University's Academic Dishonesty Policy and Diversity Education: <http://uodos.uoregon.edu/>

University of Oregon's Accessible Education Center

At this University we do our best to facilitate and support accessible education. If there are aspects of this course that result in barriers to your learning and participation, you should contact the instructor to discuss possible solutions. If you have special needs, such as test accommodations, note-taking, and sign language interpretation, please contact the Accessible Education Center (AEC) so that their personnel and the instructor can work together to help you learn comfortably in this class. The AEC office is located in 164 Oregon Hall. Telephone 541 346-1155. On the web: <http://aec.uoregon.edu/index.html> E-mail: uoaec@uoregon.edu

How to succeed in this class

- Attend and participate actively in all lectures, labs and field trips.
- Ask questions.
- Learn the language. Soil science is inherently a jargon-filled discipline and to communicate effectively with other soil scientists, one must learn the terminology.
- Do the assigned reading and answer the review questions at the end of each chapter. This will reinforce concepts covered in lecture and lab.
- Get together in small study groups regularly. Go over concepts together. Try to do this without referring to the book or your notes. This will let you know where the gaps in your knowledge are. There is no better way to learn than teaching others.
- Get 'dirty'. As you walk around campus and Eugene, grab samples of soil and try to describe them using the methods we've discussed in class.
- Don't get bogged down in the details, but instead ask yourself what is the big picture and how can I apply these concepts.

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://www.nrcs.usda.gov/wps/portal/nrcs/site/soils/home/>
- Description and distribution maps of soil orders: <http://www.cals.uidaho.edu/soilorders/>
- Soil series: http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/survey/class/data/?cid=nrcs142p2_053587
- 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>
- 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/>