

ENST 320a: Water and Soil Sustainability

Units: 4

Spring 2019, TTh 2:00-3:20 pm

Location: WPH 206

Instructors:

Dr. Scott Applebaum

Assistant Professor (Teaching)

Office: CAS 116

Office Hours: TBA

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Course Description/Rationale

Both water and soil are integral to human livelihood, and both are currently under threat. This class presents an overview of the issues related to water and soil sustainability including soil development and management, the hydrologic cycle, the cycling of nutrients through both soil and water, soil and water pollution, and food security related to soil and water issues.

Learning Objectives

- Students will gain in depth knowledge of water in the environment, focusing on how water moves through the environment, how humans use and interact with water and pollution of water
- Students will explore soil science in order to understand how the physical, chemical and biological properties of soil are important to humans and the environment.
- Students will learn how soil and water quality are intimately linked and their importance for food production and security worldwide.
- Learning objectives in this course are aligned with those of the Environmental Studies Program: <https://dornsife.usc.edu/environmental-studies/learning-objectives/>

Recommended preparation: ENST 100

Course Notes

This course will use Blackboard for communication, information and turning in assignments. Lecture slides will be made available after the lecture is given. Additional readings may be assigned periodically throughout the semester, and these will be announced in class, posted on Blackboard and via email messages sent to the class. Sometimes computers will be used in class to work with real life data in excel and run simple simulations – students will be notified when computers are needed. This course involves a lot of in depth reading and critical analysis outside of lecture, as it is a four unit course.

Required Readings and Supplementary Materials

1. Pennington, Karrie L. and Cech, Thomas V., Introduction to Water Resources and Environmental Issues, 457 pp., Cambridge. Referred to below as WREI
2. Brady, Nyle C. and Weil, Raymond R., Elements of Nature and Properties of Soils, Pearson. Referred to below as ENPS

Description and Assessment of Assignments

You will be graded on the basis of your performance on exams, written assignments, group presentations and class participation (e.g., study guide discussions, Blackboard assignments, etc.). Lecture presentations will be posted on Blackboard after the lectures. Exam questions will be drawn from course readings, lecture materials and discussions.

The Final Exam is partially cumulative and will include ~20% of material covered in the first two-thirds of the course; the remaining ~80% of the Final Exam will include only material covered after the second midterm (the last third of the course). *If there is a conflict with an exam, you must email the instructor two weeks in advance to see if alternative arrangements can be made (under reasonable circumstances).* Otherwise, **make-up exams will not be given, except in extreme emergencies.** If a student misses an exam and/or assignment due to an unexcused absence, they may receive a zero for that portion of the course. During exams, students will NOT be allowed to have notes, books, cell phones, etc. Only pens/pencils and a calculator are required. Failure to comply with exam policies will automatically result in a grade of "0" for that particular exam. (Midterm 1, 2 & Final; 325 total)

Students will analyze a set of soil data in class and submit a brief write up at a later date. The write-up will include comment on the health of these soil data based on what we have learned in class. (40 pts)

Reading guides: This assignment involves reading primary literature, answering questions outside of class and turning them in ahead of time, and a discussion of the paper in class. (see course schedule; 5 pts each, 40 pts total)

Grading Breakdown

Assignment	Points
Midterm 1	100
Midterm 2	100
Final	125
Soil data analysis	40
Reading guides	40
Field trip attendance	10
Class project	100

Grading Scale

Course final grades (based on percent total points) will be determined using the following scale: >93 = A; 90-92 = A-; 87-89 = B+; 83-86 = B; 80-82 = B-; 77-79 = C+; 73-76 = C; 70-72

= C-; 67-69 = D+; 63-66 = D; 60-62 = D-; <59 = F. Note: This scale may be adjusted depending on progress of the class.

Additional Policies

Routine attendance and active participation are an important part of each class session. For the best learning experience, you are expected to have read the course materials (see below) by the date it is discussed in class. Roll will be taken periodically in the form of thought exercises, reading assignments, and in-class questions. You are responsible for information, announcements, date changes, and any other course material presented, regardless of your participation in the classroom.

As mentioned above, if there is a conflict with an exam, you must email the instructors 2 weeks in advance to see if arrangements can be made (under reasonable circumstances). Otherwise, make-up exams will not be given except in extreme emergencies. Note that make-up exams will be more difficult (because the instructors will need to rewrite the exam specifically for you!), so it is in your best interest to take the exam on the day it is scheduled. If you have an emergency on an exam day, you must get in touch with us before the exam. Assignments will not be accepted late.

Additionally:

- Come to class prepared
- Be respectful of the instructors and other students in class
- Please leave cell phones outside the classroom or turned off
- If you have to miss class make sure you arrange to get notes and announcements

Course Schedule: A Weekly Breakdown

For the best learning experience, you are expected to have read assigned material by the date it is discussed in class. Article and supplemental readings will be posted online. The readings and schedule of topics may be adjusted throughout the semester depending on progress of the class.

	Topics/Daily Activities	Readings	Assignment/Due Dates
Tues, Jan 14	Water as a chemical	See Bb	
Thurs, Jan 16	Hydrosphere & hydrologic cycle	WREI Ch 3	
Tues, Jan 21	Watersheds & water supply Article 1 discussion (Vörösmarty)	WREI Ch 5 See Bb	Reading guide 1
Thurs, Jan 23	Watersheds & water supply	WREI Ch 5	
Tues, Jan 28	Water usage & treatment Article 2 discussion (Grant)	WREI Ch 11, 12 See Bb	Reading guide 2
Thurs, Jan 30	Water usage & treatment	WREI Ch 11, 12	
Tues, Feb 4	Microbiology & Fecal Indicator Bacteria Article 3 discussion (Karkman)	See Bb	Reading guide 3
Thurs, Feb 6	Microbiology & Fecal Indicator Bacteria	See Bb	
Tues, Feb 11	MIDTERM 1		
Thurs, Feb 13	Soil development & properties	ENPS Ch 1, 2	
Tues, Feb 18	Soil damage & sustainability Article 4 discussion (Amundson)	ENPS Ch. 4 (4.1-4.5, 4.7, 4.8), Ch. 11 (11.4-11.8), 14 (14.1-14.3, 14.11, 14.13)	Reading guide 4

Thurs, Feb 20	Soil pH and salinity	ENPS Ch. 9 (9.1-9.3, 9.6, 9.7, 9.12-9.16, 9.18, 9.19)	
Tues, Feb 25	Microbes & soil food webs Article 5 discussion (TBA)	ENPS Ch. 10 See Bb	Reading guide 5
Thurs, Feb 27	Soil measurements & analysis	See Bb	
Tues, Mar 3	Soil measurements & analysis	See Bb	
Thurs, Mar 5	Surface & subsurface water dynamics Article 6 discussion (xxx)	ENPS Ch 5, 6; WREI Ch 6	Reading guide 6
Tues, Mar 10	Surface & subsurface water dynamics	ENPS Ch 5, 6; WREI Ch 6	
Thurs, Mar 12	MIDTERM 2		Soil Report Due
Mar 15-22	SPRING BREAK HOLIDAY – NO CLASS		
Tues, Mar 24	Groundwater Contamination	ENPS Ch 5, 6; WREI Ch 6	
Thurs, Mar 26	Nutrient cycles Article 7 discussion (TBA)	ENPS Ch 11, 12, 13; See Bb	Reading guide 7
Tues, Mar 31	Nutrient cycles	ENPS Ch 11, 12, 13; See Bb	
Thurs, Apr 2	Agriculture & food security	See Bb	
Tues, Apr 7	Agriculture & food security	See Bb	
Thurs, Apr 9	Wildcaught & aquaculture fisheries Article 8 discussion (TBA)	See Bb	Reading guide 8
Tues, Apr 14	Coastal Pollution and Eutrophication	See Bb	
Thurs, Apr 16	Coastal Pollution and Eutrophication	See Bb	
Tues, Apr 21	Estuaries & wetlands	WREI Ch. 9	
Thurs, Apr 23	Estuaries & wetlands	WREI Ch. 9	
Tues, Apr 28	Water & soil conservation	See Bb	
Thurs, Apr 30	Water & soil conservation	See Bb	
May 7	FINAL EXAM: 2:00 to 4:00 PM, WPH 206		

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Support Systems:

Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. engemannshc.usc.edu/counseling

National Suicide Prevention Lifeline – 1 (800) 273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. www.suicidepreventionlifeline.org

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. engemannshc.usc.edu/rsvp

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: sarc.usc.edu

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086

Works with faculty, staff, visitors, applicants, and students around issues of protected class.
equity.usc.edu

Bias Assessment Response and Support

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. studentaffairs.usc.edu/bias-assessment-response-support

The Office of Disability Services and Programs

Provides certification for students with disabilities and helps arrange relevant accommodations.
dsp.usc.edu

Student Support and Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. studentaffairs.usc.edu/ssa

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. diversity.usc.edu

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. emergency.usc.edu

USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.

Provides overall safety to USC community. dps.usc.edu