



ENST 320a: Water and Soil Sustainability

Units: 4

Spring 2018, TTh 2-3:20pm

Location: WHP 102

Instructor: Jill Sohm

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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 an email reminder 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

Throughout the semester, the class will work on a water portfolio for Los Angeles in 2035. The work for this will sometimes be small individual assignments (bringing data to class, in class discussions). In the middle of the semester, students will work together on a group project investigating a specific water sustainability solution that we are proposing to use for LA and do an oral presentation on the details of the solution, it's monetary and energy costs, and its feasibility for LA (see below for dates and point value). A list of topics will be generated as part of our work as a class on this project and detailed instructions will be available on Blackboard. At the end of the semester, students will individually take all the information gathered during the semester and write up a water portfolio plan for future LA, justifying your plan and providing details of the costs. The goal of the written assignments and group project is for students to research an environmental issue using the primary literature as well as other reputable sources, take an informed position on a given issue based on available information, and present their position to either a general or

specialized audience. All submissions will be evaluated for originality, accuracy and thoroughness of research, attention to detail, and quality of finished project.

Reading guides will involve reading primary literature, answering questions outside of class and turning them in ahead of time, and a discussion of the paper in class and will be assessed for completeness. They will be worth 5 points each.

Exam questions will be drawn from course readings and lecture materials, and will include both multiple choice and essay questions. 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 Exam 2 (i.e., the last third of the course). ***No make-up exams or assignments will be allowed without explicit permission.*** If a student misses an exam and/or assignment, they will 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.

Grading Breakdown

Assignment	Points	% of Grade
Midterm 1	100	20
Midterm 2	100	20
Final	125	25
Soil data report (group - in class)	20	4
Water portfolio data and ideas (in	15	3
Water portfolio presentation (gro	50	10
Water portfolio report (individual	60	12
Reading guides (6 total)	30	6
TOTAL	500	100

Grading Scale (Example)

Course final grades will be determined using the following scale

A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	59 and below

Additional Policies

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. Make-up exams will also be more difficult, so it is in your best interest to take the exam on the day it is scheduled. If you have an emergency on exam day, you must get in touch with us before the exam if possible. Assignments will not be accepted late. Additionally:

- Come to class prepared
- Be respectful of me 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 the progress of the class. Below, items in bold denote due dates for assignments and exam dates. Reading discussion days are shown with italics as well.

Date	Topic	Readings
Wk 1	Introduction Introduce class project – building a water portfolio for Los Angeles 2035 Water as a Chemical	See Bb
	Hydrosphere, Hydrologic Cycle	WREI Ch 3, See Bb
Wk 2	Watersheds, Water Supply I DATA ON WATER USAGE AND POPULATION DUE	WREI Ch 5, excel tutorial (see Bb)
	Watersheds, Water Supply II: Topo Maps & Watershed Delineation <i>Article 1 (Gleick) Reading Discussion</i>	See Bb <i>See Bb</i>
Wk 3	Other Watershed tools	
	Water Usage, Treatment, Quality I	WREI Ch 11, 12
Wk 4	Water Usage, Treatment, Quality II <i>Article 2 (Grant et al.) Reading Discussion</i> IDEAS FOR ACHIEVING WATER SUSTAINABILITY GOALS DUE	WREI Ch 11, 12 <i>See Bb</i>
	Microbiology I: Fecal Indicator Bacteria	
Wk 5	MIDTERM 1	
	Soil Science: development and properties	ENPS Ch 1, 2
Wk 6	Soil erosion – in class activity Soil Science: sustainability, damage, carbon <i>Article 3 (Amundson et al.) Reading Discussion</i>	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)
	Soil Salinity and pH	Ch. 9 (9.1-9.3, 9.6, 9.7, 9.12-9.16, 9.18, 9.19)
Wk 7	Microbiology II: Microbes & Soil Food Webs Visit with LA Compost at Natural History Museum	ENPS Ch 10
Wk 8	Soil Health measurements and data work up Soil Health in class activity (short write up due at end)	See Bb (soil health manual)
Wk 9	WATER PORTFOLIO GROUP PRESENTATIONS WATER PORTFOLIO GROUP PRESENTATIONS	
Wk 10	Water Dynamics of Surface & Subsurface Water, Groundwater contamination Water Dynamics of Surface & Subsurface Water, Groundwater contamination <i>Article 4 (Dalin et al.) Reading Discussion</i>	ENPS Ch 5, 6; WREI Ch 6 ENPS Ch 5, 6; WREI Ch 6
Wk 11	MIDTERM 2 Guest lecture on San Fernando Valley groundwater contamination – Evelyn Cortez-Davis	
Wk 12	The Carbon and Methane Cycles The Nitrogen Cycle	ENPS Ch 11, 12, 13; See Bb ENPS Ch 11, 12, 13; See Bb
Wk 13	Other Nutrient Cycles: Overview & Synthesis <i>Article 5 (Cordell) Reading Discussion</i>	ENPS Ch 11, 12, 13 <i>See Bb</i>
	Coastal Eutrophication	See Bb
Wk 14	Coastal pollution Conservation agriculture	ENPS Ch 14 (14.4-14.7)
Wk 15	Food Security <i>Article Reading 6 (Godfray) Reading Discussion</i>	<i>See Bb</i>
	Water portfolio discussion WATER PORTFOLIO PAPER DUE	
	FINAL EXAM	

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