

UNIVERSITY OF SOUTHERN CALIFORNIA
Environmental Studies Program
Spring 2017

**ENST 320a: Water and Soil Sustainability
TTh 11 am -12:20 pm, WPH 203**

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Course Overview

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. **Recommended prerequisite: ENST 100**

Course Texts

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

Course Requirements

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.

Course 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/>

Course Grading

You will be graded on the basis of your performance on exams, written assignments, group presentation, 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 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.

Below is a list of the graded assignments and their point value:

Midterm 1	Feb 2	100 pts	20%
Midterm 2	March 23	100 pts	20%
Final Exam	May 9	125 pts	25%
Science Blog	Jan 24	25 pts	5%
Op-Ed Letter	April 11	25 pts	5%
Soil Data Report (group - in class)	March 21	15 pts	3%
Water Portfolio report (individual)	April 27	40 pts	8%
Water Portfolio data and ideas (indiv)	Rolling	10 pts	2%
Water Portfolio group presentation	Feb 28-Mar 2	35 pts	9%
Reading Guide Discussions (6 total)	Rolling	24 pts	5%
Total Points		499 pts	100%

Written Assignments & Group Project

Each student is required to submit 3 separate written assignments related to water and soil sustainability (science blog, op-ed, water portfolio report; due dates, and point values outlined above). This is not a group project – each student is responsible for developing, writing, and submitting their own assignment. Specific criteria and guidelines for completing each of these assignments are available on Blackboard in the ‘Assignments’ folder. 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, its monetary and energy costs, and its feasibility for LA (see above 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.

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 Section 11, Behavior Violating University Standards <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/>. 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/>. Neither discrimination, sexual assault nor harassment is tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity <http://equity.usc.edu/> or to the Department of Public Safety <http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The Center for Women and Men <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential-support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other resources. Students are expressly prohibited from recording lectures.

Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. The Office of Disability Services and Programs http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to

campus infeasible, USC Emergency Information <http://emergency.usc.edu/> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

Statement on Religious Observation Accommodations

USC policy grants students excused absences from class for observance of religious activities. Students may be given an opportunity to make up work missed because of religious observance. We are responsive to requests for an excused absence when made in advance. Please note that this applies only to religious activities that necessitate a student's absence from class and/or a conflict with a specific aspect of the course.

Course Schedule

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

Date	Topic	Readings
Jan 10	Introduction Introduce class project – building a water portfolio for Los Angeles 2035 Water as a Chemical	See Bb
Jan 12	Hydrosphere, Hydrologic Cycle	WREI Ch 3, See Bb
Jan 17	Watersheds, Water Supply I DATA ON WATER USAGE AND POPULATION DUE	WREI Ch 5, excel tutorial (see Bb)
Jan 19	Watersheds, Water Supply II: Topo Maps & Watershed Delineation Article 1 (Gleick) Reading Discussion	See Bb <i>See Bb</i>
Jan 24	Other Watershed tools SCIENCE BLOG ASSIGNMENT DUE	
Jan 26	Water Usage, Treatment, Quality I	WREI Ch 11, 12
Jan 31	Water Usage, Treatment, Quality II Article 2 (Grant et al.) Reading Discussion IDEAS FOR ACHIEVING WATER SUSTAINABILITY GOALS DUE	WREI Ch 11, 12 <i>See Bb</i>
Feb 2	MIDTERM 1	
Feb 7	Visit with LA Compost at Natural History Museum	
Feb 9	Soil Science: development and properties	ENPS Ch 1, 2
Feb 14	Soil Science: sustainability, damage, carbon Article 3 (Amundson et al.) Reading Discussion	ENPS Ch 4, 11
Feb 16	Soil erosion – in class activity Soil Salinity and pH	See Bb; ENPS Ch 9
Feb 21	Microbiology I: Microbes & Soil Food Webs	ENPS Ch 10
Feb 23	Conservation Agriculture	ENPS Ch 14
Feb 28	WATER PORTFOLIO GROUP PRESENTATIONS	
March 2	WATER PORTFOLIO GROUP PRESENTATIONS	
March 7	Water Dynamics of Surface & Subsurface Water, Groundwater contamination	ENPS Ch 5, 6; WREI Ch 6
March 9	Water Dynamics of Surface & Subsurface Water, Groundwater contamination	See Bb
	SPRING BREAK	
March 21	Soil Health in class activity (short write up due at end)	
March 23	MIDTERM 2	
March 28	The Carbon and Methane Cycles	ENPS Ch 11, 12, 13; See Bb
March 30	The Nitrogen Cycle	ENPS Ch 11, 12, 13; See Bb
April 4	Other Nutrient Cycles: Overview & Synthesis Article 4 (Cordell) Reading Discussion	ENPS Ch 11, 12, 13 <i>See Bb</i>
April 6	Wetlands Article 5 (Barbier et al.; Valiela and Fox) Reading Discussion	WREI Ch 9 <i>See Bb</i>
April 11	Microbiology II: Fecal Indicator Bacteria OP-ED ASSIGNMENT DUE	See Bb
April 13	Freshwater water and Coastal Pollution	See Bb
April 18	Coastal Eutrophication	See Bb
April 20	Food Security Article Reading 6 (Godfray, Foley) Reading Discussion	<i>See Bb</i>
April 25	TBA	
April 27	Water portfolio discussion WATER PORTFOLIO PAPER DUE	
May 9	FINAL EXAM, Tuesday May 9 11AM-1PM	