

## CEE 98 Engineers Without Borders

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**Instructor of Record:** Professor Kara Nelson

**Lecture:** Wednesday 6:00 - 7:00                      290 HMMB (for now...)

**Section 1 (Panama):** Thursday 7:00 - 8:30      212 O'Brien

**Section 2 (Peru):** Monday 5:00 - 6:30              544 Davis

**Units:** 2

**Office Hours:** Office Hours will be held Friday 9-10 in the Davis Computer Lab (Davis 345)

### Course Description:

This course addresses all aspects of design, analysis, construction, sustainability and finances of water distribution and purification systems in developing countries. It begins with an examination of fundamental design tools such as AutoCAD, and the capabilities and limitations that exist in development engineering. Water flow and distribution will be evaluated across the entire system, and students will learn how to conduct water quality testing. The construction as well as the operations and maintenance of the system will be studied. Fundraising and economic concerns will also be considered. Students will work in teams to design, build and implement a functioning water distribution system for rural communities in developing countries for one of two Engineers Without Borders Projects.

### Class Structure:

Students are required to attend a core lecture which focuses on skill building, the basics of development engineering, along with project based in-class work. The lecture will be accompanied by a section of their choice - either Panama or Peru. Members must attend both the lecture and their chosen section to receive credit for their work in EWB. These sections will focus on applying the material learned in lecture to the specific projects associated with Panama and Peru providing practical, real world practice for development engineering while helping our communities.

**Prerequisites:** None! All majors are welcome and encouraged to apply; no engineering skills are necessary.

**Grading and Expectations:**

10% Quizzes

20% Lecture Attendance

20% Presentation

20% Homework

30% Section Participation

- **Attendance:** more than 2 unexcused *lecture* absences will result in a failing grade.
- **Presentation:** final presentation detailing the work completed on the project teams
- **Quizzes:** Short quizzes to test basic comprehension and take attendance.
- **Homework:** There are 5 short assignments during the semester, some of which may be completed in class. Assignments are due online at the beginning of class, but can be submitted up to Friday at midnight, for  $\frac{3}{4}$  points.
- **Section Participation:** Determined by the Panama and Peru Project Leads based on your outside work and participation. The project leads may assign additional homework or tasks, which should be completed as instructed.
- **One Unit Option:** Instructor permission required. Lecture attendance and homework not required.

**Collaboration:**

Students are encouraged to discuss course material. However, any graded material must be their own work unless otherwise noted. If you are having difficulty with the material, please come to office hours.

**Texts:**

All readings can be found at the link below. We will be mainly using the Rural Water Supply Manual, produced by the World Bank, for our readings. Readings are intended to be supplementary to the course and provide additional background and serve as a reference. Specifics are detailed in the schedule. <https://drive.google.com/open?id=0B5ARSzNdD5-LQ3ZqN0d2TkJ4VUU>

**Schedule:** All assignments listed on date due.

Week	Lecture Date	Course Material	Assignments
1	1/24	Intro to EWB	
2	1/31	Intro AutoCAD	
3	2/7	Community Education	Reading: WASH section 4, PEACE water treatment section 3.1 - 3.6
4	2/14	Grant Writing and Finances	HW 1: Autocad Activity 1 <u><b>OR</b></u> Education Material Design
5	2/21	Water Resources and Demand Analysis	Reading: RWS Ch 3 (not F), Ch 6, skim Ch 8 A-B
6	2/28	Surveying; Community and Site Data	HW 2: Water Resources
7	3/7	Water Quality and Best Use Lecture	HW 3: Community and Water Demand Data Analytics Reading: RWS Ch 10, skim Ch 5
8	3/14	Water Quality Testing	Reading: Ch 9
9	3/21	Water Storage, Flow and Distribution	HW 4: Water Quality Alternatives and Data Analysis Reading: RWS Ch 12 and 13
10	4/4	Guest Lecturer (TBA)	
11	4/11	Construction	HW 5: Construction Processes
12	4/18	Operations and Maintenance	
13	4/25	Final Presentations	Final Presentations HW 6: Technical Expertise Writeup