

ENVR 582: Sanitation for Development
Fall Term 2016

Location: Michael Hooker Research Center Basement Rooms 0003/0004

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Class Hours: Tu-Th 12:30 – 1:45	Office Hours: by appointment

Background: “Sanitation” can mean many things, but is defined in this course as the infrastructure for the safe management of human excreta (feces and urine.)¹ In plainer English, it’s the hardware for safe collection, treatment and disposal or reuse of human feces and urine. This definition is consistent with current usage in international development and the WaSH (Water, Sanitation and Hygiene) sector.

Sanitation is critical for human health and dignity, yet over 2.5 billion of us (approximately 40% of us) don’t have access to “improved” or acceptable sanitation. Poor sanitation contributes to many of the approximately 900,000 deaths a year of children under the age of five from diarrheal disease, and billions of infections with intestinal parasites, (especially worm infections,) which make a significant contribution to global malnutrition. Inadequate management of human excreta also creates major environmental problems of water pollution, leading to the “death” of rivers and lakes from anoxia and eutrophication.

This course presents the problems and context of inadequate sanitation in the developing world, and, more importantly, the types of solutions and approaches available to reduce these problems.

Target audience: This course is designed for undergraduate and graduate students who wish to understand the problems of inadequate sanitation, and current approaches with which these problems are addressed.

Course Prerequisites: There are no prerequisites for this course, except curiosity and an interest in the topic.

Course Goals and Key Learning Objectives: The goal of this course is to introduce participants to the many problems of inadequate sanitation in the developing world, and common technical and institutional approaches to resolving them. Put another way, the goal of this course is to enable students to become “practically literate” in the challenge of inadequate sanitation, so that they are able to understand and contribute to the global struggle for its improvement.

By the end of the course, successful students will be able to:

- a) Identify the nature and magnitude of health problems associated with inadequate sanitation
- b) Identify the nature of environmental threats (especially to aquatic life) from wastewater pollution
- c) Identify the principal technical approaches to sanitation and wastewater management
- d) Select, in a given physical and socioeconomic context, the most appropriate technological options to consider, and describe both advantages and disadvantages of these options
- e) Understand and describe the economic and institutional challenges of sanitation
- f) Draw lessons from some case studies of successful sanitation interventions, and describe the contexts in which they may, or may not, be reproducible

Course Requirements: Students will be required to read and think critically about a range of articles and book abstracts about sanitation and health. Students will also be required to take part in basic exercises for the comparison of different technical options. Students must submit a **fifteen-page term paper** (double-spaced, including references) on an approach to sanitation promotion in the developing world including

¹ In many languages, and in English in the past, Sanitation can refer to the entire system of environmental management for human health and has thus included water supply, solid waste management, air pollution control, and sanitary inspection of food handling. Some authors describe this broader group of activities as “environmental sanitation” or “environmental sanitation services”.

Ecological/Sustainable Sanitation (where the reuse of wastes plays a major role in the promotion), Community-Led Total Sanitation, Sanitation Marketing, etc. The paper must reflect critical consideration of the strengths and weaknesses or limitations of the approach. The course assessment will also include both a mid-term and a final examination.

Grades: Grades will be based on the sum of individual assessments as follows:

Mid-Term Examination	20%
Term-paper	30%
Final Exam	40%
Class Participation	10%

Classroom participation will be assessed on the basis of engagement during lectures (Q&A), and the class discussions/debates.

Course Policies:

Regular attendance of the class is expected.

Course Policies with Honor Code implications: Term papers are a way to provoke individual learning about approaches to sanitation, and should reflect individual efforts. This means that while students are encouraged to share ideas with each other about their topics, the papers should nevertheless reflect individual, not collective, effort on the topic. Similarly, students should be cognizant of the strict standards of the University on plagiarism, and all sources of ideas and text should be clearly annotated. Exams will be closed book, and no use of cellphones during the exam will be permitted.

Missed exams. There will be a midterm on Tuesday Oct 6 and a final exam on Friday Dec 9. To reschedule a missed exam, you must present a letter from your Healthcare Provider or from the Dean of Students that explicitly states that you were unable to attend the exam at the scheduled time.

Course Resources: These will be available on Sakai, and will consist largely of public domain materials available from the web.

Syllabus Changes: The instructor reserves to right to make changes to the syllabus, including the schedule and content of lectures, the paper assignment due date and test dates. These changes will be announced as early as possible.

Week	Session	Topic	Date	Readings/remarks and Assignments due
1	1	Introduction...course outline; Why Sanitation Matters	Tu 8/23/2016	
	2	Health Aspects...fecal-oral disease and its toll	Th 8/25/2016	Read first 3 chapters of: Sanitation and Disease (Feachem) in Epi folder on Sakai
2	3	Health Aspects Part II...epidemiology; what difference does sanitation make	Tu 8/30/2016	
	4	Work on group exercises on health	Th 9/1/2016	Read case study material on Sakai
3	5	Report Out on group exercise	Tu 9/6/2016	
	6	Sanitation and cholera in Haiti	Th 9/8/2016	Read UN outbreak report

Week	Session	Topic	Date	Readings/remarks and Assignments due
4	7	Excreta and water pollution. DO, sag curves, and nutrients	Tu 9/13/2016	
	8	Environmental Role Play plus Intro to Sanitation Technologies/pit latrines	Th 9/15/2016	Scan the Sanitation compendium online Read role play set-up
5	9	Septic Tank Design & Sewerage	Tu 9/20/2016	
	10	Technology Choice Exercise	Th 9/22/2016	
6	11	Wastewater Treatment, Sanitation Framework	Tu 9/27/2016	
	12	Fecal Sludge Management	Th 9/29/2016	
7	13	Review for Midterm	Tu 10/4/2016	
		Midterm Exam	Th 10/6/2016	MIDTERM EXAM
8	14	Reading Day: Reading and Discussion of Public and domestic domains in the transmission of disease , Cairncross et al.	Tu 10/11/2016	Remarks: Pete K at water & health conference
	15	Epidemiology and Interventions (Karen Yeatts)	Th 10/13/2016	Remarks: Pete K at water and health conference
9	16	Exam recap, introduction to reuse	Tu 10/18/2016	
		FALL BREAK	Th 10/20/2016	
10	17	Waste Reuse and EcoSan	Tu 10/25/2016	Duncan Mara on reuse
	18	Introduction to interventions /sanitation promotion	Th 10/27/2016	
11	19	Intro to CLTS in Theory	Tu 11/1/2016	
	20	CLTS in practice	Th 11/3/2016	(Tentatively) Taught by Jonny Crocker
12	21	Sanitation marketing...in theory	Tu 11/8/2016	
	22	SanMark in Practice	Th 11/10/2016	(tentatively) Taught by Kaida Liang
13	23	Sanitation marketing...case studies	Tu 11/15/2016	
	24	Sanitation Finance: paying in the real world	Th 11/17/2016	
14	25	Economics of sanitation: REAL costs and benefits	Tu 11/22/2016	TERM PAPERS DUE
		Thanksgiving	Th 11/24/2016	
15	26	Political Economy of Sanitation	Tu 11/29/2016	
	27	Term Paper Presentations	Th 12/01/2016	
16	28	Final Q and A	Tu 12/6/2016	
		Final Exam at NOON	Fri 12/9/2016	FINAL EXAM