UCLA School of Public Health
EHS 461
Water Quality and Health

Course Syllabus—Fall Quarter, 2018

	<u>Introduction</u>
October 1	Water Quality Concerns, an Introduction to Course
October 3	Environmental Standards for Water Quality Protection
	<u>Sources of Contaminants in Water Supplies</u>
October 8	Sources of Contaminants in Water
October 10	Sources of Contaminants in Wastewater Effluent
	<u>Concentration of Chemicals in Treated Water Supplies</u>
October 15	Trace Metals and Other Inorganics
October 17	Organic Chemicals
	<u>Microbiological Contaminants in Water Supplies</u>
October 22	Major Waterborne Microbial Contaminants
October 24	Coliform Bacteria and Viruses
October 29	MID-TERM
	<u>Risk Assessment</u>
October 31	Assessment of Risk from Contaminant Exposure
November 5	Water Quality Case Studies for Risk Assessment
	<u>Stream Water Quality – the Need for Treatment Options</u>
November 7	Aspects of Stream Pollution
November 12	*Veterans Day Holiday*
November 14	Oxygen sag curves and Streeter-Phelps models; evaluation of TOC, BOD, COD
	<u>Water Treatment Processes</u>
November 19	Chemical Coagulation Techniques
November 21	Activated Carbon Treatment, Ion Exchange, Desalinization, and Reverse Osmosis Processes
November 26	Disinfection Options and Concerns
	<u>Waste Water Treatment Options</u>
November 28	Primary and Secondary Treatment of Sewage
December 3	Advanced Wastewater Treatment Schemes
December 5	Overall Course Summary for Water Quality Issues

Reading List

The reading list evolves during the course according to classroom discussion, questions posed by students, etc.

The standard reading list is as follows:

1. *Aquatic Chemistry* by Werner Stumm and James Morgan. Wiley-Interscience, 3rd edition, 1996.
2. *Aquatic Chemistry* by Werner Stumm and James Morgan. Wiley-Interscience, 2nd edition, 1996.
3. *Standard Methods for the Examination of Water and Waste Water* by the American Public Heath Association, the American Water Works Association, and the Water Environment Federation. 2012.
4. *Water Quality and Treatment: A Handbook on Drinking Water* by James Edzwald (ed.). McGraw-Hill, 2011.
5. *Federal Register, July 18, 2003, Part VI, National Primary Drinking Water Regulations, Announcement of Completion of EPA's Review of Existing Drinking Water Standards, Notice.* U. S. Environmental Protection Agency, 2013.
6. *The Ghost Map* by Steven Johnson. Riverhead Books, 2007.
7. *Control of Communicable Diseases Manual*. APHA Press, 20th edition, 2014.
8. *Limnology: Lake and River Ecosystems* by Robert G. Wetzel. Academic Press, 3rd edition, 2001.
9. *Environmental Hydrology,* by Andrew Word and Stan Trimble. Lewis Publishers, CRC Press, 2nd edition, 2004.
10. *Drinking Water: A History* by James Saltzman. Overlook Publishers, 2012.
11. *Water Resources: an Integrated Approach* by Joseph Holden (ed.). Routledge Publishers, 2014.
12. *Environmental Protection* by Emil T. Chanlett. McGraw-Hill College, 2nd edition, 1979.

Learning Objectives

The goals of the course are to provide an understanding of water quality and health principles to public health students and those from other engineering programs on campus.

Field trips to various water agencies and treatment plants will be considered. The trips will help to visualize applications of chemical principles to water bodies and technology operations. The course is designed for graduate students and serious upper-class undergraduates. Students enrolled in Public Health, Environmental Health, engineering fields, or chemistry are considered appropriate enrollees to the course.

Core Competencies

The goals for learning objectives and core competencies for the course EHS 401 are similar to those listed for MS/MPH candidates in environmental health sciences.

The course strives to incorporate chemistry and biological principles in the understanding of environmental measurements. Students completing the ten-week course should be able to:

- gain an understanding of the formation of water bodies and their chemical and biological constituents, any sources and sinks of chemicals and microbes in water bodies;
- gain understanding of water reuse and recharge strategies, supplementation of water bodies;
- gain an understanding of desalinization techniques for production and supplementation of water resources;
- gain an understanding of health implications through criteria document reviews;
- gain an understanding of treatment technologies for raw water supplies and those of wastewater treatment systems;
- gain skill and knowledge in the development and design of research projects and the ability to follow the designs to completion through discussion.

Core competencies in the above knowledge objectives will be developed through lecture format of topics given above. In addition field trips to local agencies to understand issues faced by such agencies as Water Resources Control Board or the Dept. of Water Resources. The calculation of reference dose (RfD) and acceptable daily intake (ADI) estimates for toxicological studies of exposure to animals and humans will be explored.