CEE 4114: FUNDAMENTALS OF PUBLIC HEALTH ENGINEERING

Spring 2008
Time and location: Monday-Wednesday-Friday from 10:10-11:00, Derring 1076
Instructor: Dr. Peter Vikesland, 415 Durham Hall, PeterVikesland@vt.edu, (540) 231-3568
Office hours: Mondays 1:00-3:00
Teaching Assistant: E. Matthew Fiss
Office Hours: TBA
Web address: Class notes, class problems, reading assignments, and homework solutions will be posted on the Blackboard website.

This course examines the engineering aspects of public health protection. Emphasis is placed upon providing an introduction to many of the biological and chemical hazards faced by humankind. Basic epidemiological concepts will be introduced and utilized throughout the course. These concepts provide a framework to assess both existing and emerging threats to human health.

Course Objectives:
1) To acquire an understanding of the basics of epidemiology and how they are used in public health engineering.
2) To obtain an awareness of the numerous health hazards, both biological and chemical, that threaten the well-being of humankind throughout the world.
3) To have a working knowledge of the public health engineering principles which have been developed for protection against biological and chemical threats.
4) To have knowledge about the major communicable diseases that plague humankind, the organisms that cause them, the ways they are transmitted, and the methods that are used to control them.
5) To know control methods and technologies applicable in both developed and lesser-developed regions of the world.

Course Format: The class will be taught interactively. Both lectures and in-class small group activities will be used. A course outline is attached.

Lecture Notes: Supplemental material for each of the lectures will be posted on Blackboard. You should download and print this material before coming to class, as this will aid your understanding of the material presented in class.

Textbook: No textbook is assigned. Reading materials will be posted on Blackboard. These readings should be printed/photocopied and read prior to the class during which they are being discussed.

Grading Policy: The course grade will be determined using the following distribution: 14% homework, 14% in-class participation, 24% paper and in-class presentation, and 48% for exams. The class will be graded on the following scale: (A) 95-100; (A-) 92-94; (B+) 89-91; (B) 85-88; (B-) 80-84; (C+) 77-79; (C) 74-76; (C-) 70-73; (D+) 67-69; (D) 64-66; (D-) 60-63; (F) <60.

Homework	Assigned bi-weekly and may be completed and turned in by small groups (1-3 people) of students. However, each individual is responsible for a complete understanding of the assignment. Late homework will not be accepted.
In-class participation	Throughout the semester a number of in-class 'case studies' will be conducted. These 'case studies' are designed to illustrate the points raised in the lectures and readings and are considered an integral part of the class. (See me **in advance** if you will be unable to attend one of these classes so that we can work out an alternative activity.)
Mini-Project	Details are forthcoming.
Exams	Four exams will be given throughout the semester, with the fourth scheduled during the final exam period. The lowest of the exam scores will be dropped and the remaining three will each be worth 16%.

Honor System: *All aspects of the coursework for this class are covered by the University Honor System. As noted, the **homework** may be completed by small groups (1-3 people), however, each individual must sign the submitted copy of the homework. By doing so they attest that they contributed in some manner to the final product. Students are encouraged to review the Honor Code and Honor System as described in either the Undergraduate Course Catalog and Academic Policies Handbook or in the Graduate Policies and Procedures Handbook.*

Special Needs: If you need adaptations or accommodations because of a disability (e.g. learning, attention deficit disorder, psychological, physical, etc.), if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please make an appointment or email me prior to January 26th.

Week	Lectures	Discussion Topic	Reading Assignment	Homework (Estimated dates)
Jan. 14	1-3	Introduction to the class Environmental disease Epidemiology Introductory case study*	'Environmental Disease' by Gary S. Moore WHO – "Water for Health"	HW 1 – assigned
Jan. 23	4-5	Epidemiology Epidemiology in-class activity Public health measures for disease control	Epidemiology reading pgs. 847-858; 862-864	HW 1 – due HW 2 – assigned
Jan. 28	6-8	Inorganic and Organic Hazards Human exposure to toxic metals Atrazine case study*		HW 2 – due HW 3 - assigned
Feb. 4	9-11	Inorganic and Organic Hazards Human exposure to pesticides and other organic chemicals	Epidemiology reading pgs. 866-873	HW 3 – due
Feb. 11	12-14	Vector-borne disease Vector-borne disease case study* Vector-borne disease control methods **Exam 1 – Epidemiology and Organic/Inorganic Hazards (Feb 15)**		HW 4 – assigned
Feb. 18	15-17	Common source diseases Emerging diseases Emerging disease control methods		
Feb. 25	18-20	Malaria case study* Waterborne disease; Typhoid in Tajikistan		HW 4 – due HW 5 - assigned
Mar. 10	21-23	Health aspects of excreta disposal Wastewater treatment fundamentals Emerging disease case study*		
Mar. 17	24-26	**Exam 2 – Emerging diseases, foodborne illness, and waterborne disease** On-site wastewater treatment		HW 5 – due HW 6 - assigned
Mar. 24	27-29	Septic system design		HW 6 - due
Mar. 31	30-32	Water Reuse		
Apr. 7	33-35	Risk assessment and standard setting Risk assessment case study*		HW 7 – assigned
Apr. 14	36-37	**Exam 3 – Wastewater** Risk assessment and standard setting Water treatment fundamentals		HW 7 – due HW 8 – assigned
Apr. 21	38-40	Drinking Water Disinfection Cryptosporidium case study*		
Apr. 28	41-42	Drinking Water Disinfection **Exam 4 - Risk assessment, water disinfection, water reuse**		HW 8 - due