

SOS 6932/4932
Sections 5514/6318
Spring '08
Survey of Water, Soil, and Public Health
Course Syllabus

Instructors

Dr. G.A. O'Connor

Office: 410 Newell Hall
Soil and Water Science Department
PO Box 10510
392-1803 ext. 329
GAO@ufl.edu

Dr. N. Freeman

Office: Center for Environmental and Human Toxicology
Bldg 471 Mowry Road
PO Box 110885
392-4700 ext. 1-5545
nfreeman@php.ufl.edu

E. A. Hodges, MPH

Office: 408 Newell Hall
Soil and Water Science Department
PO Box 10510
392-1804 ext. 327
lizah@ufl.edu

Meeting Times

M/W/F 2nd period

Meeting Room

McCarty B 2102

Office Hours

Email to arrange

Course Description

The intersection of water/soil science and public health is bustling with real world examples of how the two disciplines are inextricably connected. From agriculture to constructed wetlands, dust storms to bioremediation, soil science has enormous implications for the protection and promotion of public health. Similarly, countless critical public health issues including asbestos exposure, drinking water contamination, and heavy metal poisoning have serious consequences in terms of soil quality and soil management. This course is designed to highlight important instances where water/soil science and public health merge, and to develop in students skills required for competency in both disciplines. The unique perspective gained through the combination of water/soil science and public health methods will enable students to take an integrative approach to identifying, evaluating, and managing relevant environmental health problems.

Course Objectives

- Describe the various disciplines of public health and discuss issues/trends currently shaping the field
- Describe basic soil characteristics and physical/chemical reactions that enable preliminary estimates of how various contaminants may move, react, and dissipate in a dynamic soil environment
- Describe factors which influence exposure pathways, exposure behaviors, and health outcomes as they relate to soil properties, water/soil quality, and water/soil management
- Highlight important and/or innovative environmental contamination prevention strategies and remediation techniques that serve to protect and promote public health
- Examine processes of site evaluation, health impact assessment, data reporting, and public communication through in-class review of "real life" water/soil contamination examples
- Critically review, understand, critique, and apply information in published water/soil science and public health literature

Texts

Provided by Instructors:

Loynachan, T., Brown, K., Cooper, T., Kimble, J., Milford, M., Smith, D. 2005. Soils, society, and the environment. AGI Environmental Awareness Series, 9.

Optional:

National Research Council (U.S.) Committee on Bioavailability of Contaminants in Soils and Sediments. Bioavailability of Contaminants in Soils and Sediments: processes, tools, and applications. [electronic resource] Washington, D.C. National Academies Press. 2003. <http://www.nap.edu/catalog/10523.html#toc>

Course Format

Classes consist of three 50-minute lectures each week.

Class Structure

The course is divided into four units: 1. Public Health, 2. Water/Soil Science, 3. Application of Soil/Water Science Principles to Public Health Promotion and Protection: Illustrative Examples and Guest Lectures, and 4. Detailed Case Studies. Unit 1 will address the field of public health, approaches to measuring health, exposure routes, risk assessment, environmental monitoring, and legal and regulatory frameworks. Unit 2 will introduce the field of water/soil science and include lectures on soil physicochemical properties, water/soil microbiology, soil water, contaminant bioavailability, and environmental fate of contaminants. Unit 3 will incorporate guest lectures by experts in specific fields exemplifying the intersection of public health and water/soil science. Material presented in Units 1 and 2 will be actively applied to exploring and understanding the illustrative topics presented in Unit 3. Lastly, Unit 4 will allow the class to take a detailed look at multiple case studies of the interaction between public health and soil/water science. The class will participate in an in-depth examination of selected public health issues and investigate case-specific means of environmental contamination, health assessment, risk communication, and remediation/prevention strategies. In addition, students will each select individual case studies to research as a final term paper topic.

If time permits, students will present select term paper topics. (Please see the Student Evaluation section for details on final papers and selection criteria.) The final paper is due on the Wednesday of exam week.

Student Responsibilities

- *Attendance and reading:* We expect you to attend all meetings of the class, and to come prepared to discuss the readings at each and every class meeting.
- *Handing in assignments:* Unless otherwise stated, all assignments must be turned in at the beginning of class on the day they are due.
- *Late or make-up assignments:* Assignments will be marked down 5 percentage points for each day late. Please remember, homeworks in this class are assigned to prepare the student for class discussions. If you do not complete the homeworks in time for discussion, your participation will suffer.
- *Completion of all assignments:* You must complete all assignments and participate in class in order to pass the course. We will not average a grade that is missing for any assignment.
- *Common courtesy:* Cell phones and other electronic devices must be turned off during class. Students who receive or make calls/messages during class will be asked to leave. The instructors reserve the right to ask any student engaging in disruptive behavior (e.g. whispering, reading a newspaper) to leave the class. Repeat violations of these rules will result in dismissal from the class.

Student Evaluation

- Three examinations
 - 100 points each (300 points total)
 - Graduate student exams will contain 1 or more additional questions as compared to the undergraduate exams
- Periodic homework assignments (100 points total)
- Final paper (100 points)
 - Paper topics will address an example of the intersection of public health and water/soil science
 - Graduate students are required to write a 15-page paper, and undergraduate students are required to write a 7-page paper.
 - All papers require proper citation of references.
 - The professors may select a number of papers for brief student presentations. Papers for presentation will be selected based upon topic and student performance. Students who present will earn extra credit but have the option to decline the opportunity.
- Total Points = 500
- Course grades are determined by summing all scores, dividing by the maximum score possible (500 points), and multiplying by 100. Grading follows University standards: 100-90 = A, 89-85 = B+, 84-80 = B, 79-75 = C+, 74-70 = C, 69-65 = D+, 64-60 = D, ≤ 59 = E. The instructor reserves the right to add

0-5 points to the final percentage score on the basis of meaningful class participation, demonstrated student interest, and overall student dedication. Utilizing professor and teaching assistant office hours is encouraged.

Course Policies

On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The University specifically prohibits cheating, plagiarism, misrepresentation, bribery, conspiracy, and fabrication. For more information about the definition of these terms and other aspects of the Honesty Guidelines, see <http://www.chem.ufl.edu/~jtl/honor.html>. Any student demonstrated to have cheated, plagiarized, or otherwise violated the Honor Code in any assignment for this course will fail the course. In addition, violations of the Academic Honesty Guidelines will result in judicial action and the sanctions listed paragraph XI of the Student Conduct Code.

Accommodations for Students with Disabilities

Students requesting classroom or laboratory accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. Please do not hesitate to utilize this opportunity if necessary.

UF Counseling Services

Resources are available on campus for students having personal problems or lacking clear career and academic goals, which interfere with their academic performance. These resources include:

1. University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling
2. Student Mental Health, Student Health Care Center, 392-1171, personal counseling
3. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual assault counseling
4. Career Resource Center, Reitz Union, 392-1601, career assistance and counseling

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

General Topic Outline

I. Public Health (Weeks 1-4, Jan. 7 – Feb. 1)
A. General field overview B. Environmental health regulations C. Risk assessment D. Approaches to the study of public health E. Health in environmental impact assessments
Exam 1 (Monday, Feb. 4)
II. Soil and Water Science (Weeks 5-10, Feb. 6 – Mar. 19)
A. Water quality and soil functions B. General water and soil properties: physical, chemical, biological C. Relationship between soil properties, water quality, and environmental health a. Contaminant retention/release b. Microbial degradation c. Leaching and runoff D. Soil and water degradation and public health E. Soil remediation
Exam 2 (Friday, Mar. 21)
III. Application of Soil and Water Science Principles to Public Health Promotion and Protection: Illustrative Examples and Guest Lectures (Weeks 11-13, Mar. 24 – Apr. 9)
Potential Discussion Topics: A. Agricultural and household pesticide use B. Pharmaceuticals and personal care products in soil and water C. Land degradation, dust storms, and respiratory distress D. Arsenic contamination in soil and drinking water E. Lead contamination in soils F. Chromium contamination in soils G. Soil and waterborne pathogens H. Industrial development and land degradation I. Human sanitation, water quality, and disease J. Septic tank citing K. Land application of wastes L. Concentrated animal feeding operations, water quality and disease M. Natural disasters (e.g. flooding, landslides, storm water runoff) and effects on public health N. Acid rain and effect on mobilization of soil contaminants/components O. Soil quality, food availability, crop nutritional value P. Nutrient management Q. Landfill leachates R. Constructed wetlands S. Water scarcity T. Perchlorate and water contamination
Exam 3 (Friday, Apr. 11, Take-home)
IV. Detailed Case Studies (Weeks 14-15, Apr. 14 – Apr. 23)
A. Role of soil and water in selected public health issues a. Means of contamination/degradation b. Means of contamination assessment, reporting, and communication c. Public health implications d. Prevention/Remediation strategies B. Student selected topics

Final Paper Due In Class by 12:30 (afternoon) Wednesday of Exam Week (Apr. 30)