Florida International University
Department of Civil and Environmental Engineering

Course Syllabus
ENV 3001: Introduction to Environmental Engineering (3 credits)
Fall Semester 2010: August 23, 2010 – December 4, 2010

Overview:

The role of the environmental engineer is to protect public health and safety from the adverse effects of pollution and to ensure that nature's ecosystems are not adversely affected as they are used to benefit man. This course introduces students to environmental problems and their resolution including water and wastewater treatment, air pollution and control, and solid and hazardous waste management. A significant portion of the course is devoted to a review of general and physical chemistry. The associated laboratory class ENV 3001L illustrates several analytical techniques commonly used in the analysis of environmental samples, and demonstrates the mechanisms involved in some of the treatment processes. This course will also address FIU's Global Learning outcomes.

Catalog Course Description:

Introduction to environmental engineering problems; water and wastewater treatment, air pollution, noise, solid and hazardous wastes.

Prerequisites:

CHM 1046 and CHM 1046L, PHY 2049, MAC 2312 and permission of undergraduate advisor.

Corequisite:

ENV 3001L Environmental Laboratory

Instructor:

Dr. Shonali Laha, P.E.
Office Location: EC 3742
Phone: 305-348-1092
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Office hours: Tuesdays and Thursdays 1100 – 1200, Tuesdays 1400 – 1500, Wednesdays 1400 – 1600, and by appointment.

Location and Timing:

Room: EC 1112
Tuesdays and Thursdays 9:30 – 10:45

Final Examination:

Tuesday, December 7, 2010: 9:45 – 11:45

Textbook:

Gilbert Masters and Wendall Ela, *Introduction to Environmental Engineering and Science*, Third Edition, Prentice-Hall, Inc., 2007 (ISBN: 13:978-0-13-148193-0)

Excellent Science Reading:

Bill Bryson, *A Short History of Nearly Everything*, Broadway Books, 2003.
Alan Weisman, *The World Without Us*, St Martin's Press, 2007.
Peter Pringle, *Food, Inc.: Mendel to Monsanto – The Promises and Perils of the Biotech Harvest*, Simon and Schuster, 2003.

Useful Reference Books:

Howard, A.G., *Aquatic Environmental Chemistry*, Oxford University Press, 1998 (ISBN: 0-19-850283-4)
Davis and Cornwell, *Introduction to Environmental Engineering*, McGraw-Hill, Inc., 1991
Sawyer and McCarty, *Chemistry for Environmental Engineering*, Third Edition, McGraw-Hill, Inc., 1978
Benefield, Judkins, and Weand, *Process Chemistry for Water and Wastewater Treatment*, Prentice-Hall, Inc., 1982
Tchobanoglous and Schroeder, *Water Quality*, Addison-Wesley Publishing Company, 1985

Global Learning Outcomes:

1. Students will demonstrate an understanding of the interrelatedness of environmental problems around the world, that these problems have no national borders, and that the extent of these problems is affected by the different socioeconomic, technological, and other conditions. (The third assignment will assess this outcome.)
2. Students will be able to conduct an analysis of the global nature of a selected environmental problem and the extent to which factors such as economics, technology, and society contribute to the problem. (This will entail a group project to be presented on Thursday November 4)
3. Students will demonstrate a willingness to develop an engineering solution, process, or technology that reduces adverse environmental impact, is more sustainable, and is appropriate within the framework of economic, technological, and societal factors at national, regional, and global levels. (For the assessment of this outcome students will write a 500-word reflection on how the group project has impacted their personal and professional problem solving philosophy as an environmental engineer and the influence of the project or course on that philosophy.)

Exit Competencies:

After successful completion of this course students should be able to:

1. Articulate the role of the environmental engineer in protecting public health and safety, and in restoring/preserving natural resources
2. Understand the relevance of concepts in general and physical chemistry in determining the quality and treatment options for water supplies, wastewater, and air pollution
3. Apply mass balance, chemical kinetics, and other empirical and semi-empirical concepts and techniques in developing basic treatment schemes.
4. Gain familiarity with both the traditional and the less common environmental contaminants
5. Identify unit operations/processes likely to be successful at eliminating these contaminants.

Grading Criteria:

The final grade will be based on the following criteria totaling 100 points:

Quizzes	50
Final Exam	30
Homework/class participation	10
Global Learning Project	10

Extra credit for field trips: maximum 5 points

General Observations/Policies:

The class meets twice a week for an hour and fifteen minutes. I appreciate punctuality and will penalize tardiness, especially in view of the short class time. The environmental laboratory class (ENV 3001L) is scheduled for later in the evenings, and although I am not listed as the lab instructor, the material covered in the lab sections will emphasize much of the chemistry in the theoretical sessions.

I cannot tolerate cell phones and beepers ringing during class hours. Please turn off the ringers as a courtesy to your fellow classmates and me – I will certainly penalize violators of this principle in their grade assignment.

Finally, I generally like to take the class for field trips to Miami-Dade County facilities such as the solid waste facility, the water and wastewater treatment plants, the Everglades National Park, etc. I believe such trips are very beneficial to your learning but do expect class participation, if not enthusiasm!

Also review the "University Misconduct Statement" below:

University Misconduct Statement

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.

Misconduct includes: Cheating – The unauthorized use of books, notes, aids, electronic sources; or assistance from another person with respect to examinations, course assignments, field service reports, class recitations; or the unauthorized possession of examination papers or course materials, whether originally authorized or not. Plagiarism – The use and appropriation of another's work without any indication of the source and the representation of such work as the student's own. Any student who fails to give credit for ideas, expressions or materials taken from another source, including internet sources, is responsible for plagiarism.

In addition to this specific University Misconduct Statement, I expect students to demonstrate courtesy to their peers and to me in the classroom. This includes turning off cell phones during class hours, not talking amongst your selves and disrupting the class, etc. While attendance in lectures is not mandatory, I believe that you can learn quite a bit through attending class. Similarly, while you may work in groups on assignments, I hope that you will each individually strive to understand how to solve each assignment problem since that is essential to your overall class understanding and your performance in tests. Quizzes and tests are of course an individual performance assessment and there can be no collaboration or joint efforts in these!

Tentative Class Schedule:

Date	Lec	Topic	Chapter
8/24	1	Course introduction.	
8/26	2	Mass balance; spreadsheet usage, library resources (HW-1: due 9/7)	1
8/31	3	Mass balance concepts.	1
9/2	4	Energy transfer concepts.	1
9/7	5	Chemistry review	2
9/9	6	Chemistry review (HW-2: due 9/21)	2
9/14	7	Complete chemistry review	2
9/16	8	Growth modeling	3
9/21	9	Resource consumption	3
9/23	10	Population growth and resource consumption (HW-3*: due 10/12 – this is the assignment that addresses the Global Awareness outcome)	3
9/28	11	Demography	
9/30	12	Risk assessment	3
10/5	13	Risk assessment	4
10/7	14	Human exposure and risk characterization	4
10/12	15	Groundwater: contaminant transport, remediation technologies	5
10/14	16	Water resources and water quality parameters	
10/19	17	Water resources and water quality parameters (HW-4: due 10/28)	5
10/21	18	Water supply engineering	6
10/26	19	Municipal wastewater treatment	6
10/28	20	Unit operations and process flow diagrams (HW-5: due 11/9)	5
11/2	21	Review water and wastewater treatment	6
11/4	22	Project presentations (Global Perspective Outcome)	6
11/9	23	Hazardous waste treatment	6
11/11	24	Air pollution (HW-6: due 11/30)	7
11/16	25	Air pollution, air quality parameters	7
11/18	26	Indoor air quality	7
11/23	27	Solid waste management	9
11/25		Thanksgiving holiday – no class, read about global atmospheric change	
11/30	28	Solid waste management (Global Engagement Outcome – due)	9
12/2	29	Review Class	

ABET-related Objectives & Outcomes

This course accomplishes, to various extents, the following ABET-related objectives and outcomes:

Objective 1 - Technical Proficiency: Our graduates will have the ability to:

3a. Apply knowledge of mathematics, science, and engineering to solve civil engineering problems;
3e. Identify, formulate, and solve civil engineering problems;
3k. Utilize the techniques, skills, and modern scientific and engineering tools necessary for civil engineering practice.

Objective 2 - Communication: Our graduates will have an acceptable level of proficiency in:

3d. Working with others as part of multi-disciplinary teams;
3g. Written, oral, and graphical communication.

Objective 3 – Responsible Citizenship: Our graduates will have an acceptable level of appreciation for and understanding of:

3h. The impact of engineering solutions in a global and societal context;
3j. Contemporary issues facing society as a whole.

Objective 5 – Ethical Behavior: Our graduates will:

3f. Have an understanding of professional and ethical responsibility.

The outcome identifiers, herein used (e.g., "3h"), correspond to the same calling system that is used in the ABET Criteria for Accrediting Engineering Programs (www.abet.org).

Traditionally ENV 3001 addresses the following objectives and outcomes:
3a, 3e, 3k, 3g, 3h, and 3f; and to a lesser extent 3i.
With the Global Learning Outcomes will also address outcomes 3d and 3j.