

ENV 4001: ENVIRONMENTAL SYSTEMS ENGINEERING
Department of Civil & Environmental Engineering
University of South Florida

Prof. Cunningham

Spring 2012

Course Description (quoted from Search-A-Bull)

An introduction to various aspects of environmental problems faced by today's society. Topics covered are: air pollution, water pollution, noise pollution, solid waste management, ionizing radiation, disease transmission, and food protection.

Course Description (quoted from OASIS)

An introduction to environmental engineering with an emphasis on protection of air, water, and land resources. Topics covered include water quality engineering, solid and hazardous waste management, air quality control, fate and transport of contaminants in the environment, and regulatory issues. An overview of engineering issues associated with noise control and ionizing radiation is presented.

So what will we really cover this semester?

The OASIS description is pretty accurate, except that we probably won't have time for even a cursory overview of noise control or ionizing radiation. (Those topics are covered in some environmental engineering text books, if you are interested.) We will start with a brief chemistry review. One concept that will pervade this semester is the *material balance* as a tool for solving engineering problems.

Course Objectives

During this semester, students should learn:

- how to apply material balances to solve engineering problems;
- what types of problems are commonly encountered by environmental engineers (including water resources engineers and other civil engineers), and/or the role of environmental engineers in society;
- some of the most common approaches adopted by environmental engineers to describe and solve the problems that we encounter; and
- the issues involved in solving new or emerging environmental problems, particularly complex and/or inter-disciplinary problems.

Learning Outcomes (ABET “a through k” outcomes)

The work completed by students in this course will help those students to attain:

- (a) an ability to apply knowledge of mathematics, science, and engineering;
- (d) an ability to function on multi-disciplinary teams;
- (e) an ability to identify, formulate, and solve engineering problems;
- (g) an ability to communicate effectively;
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context; and
- (j) a knowledge of contemporary issues.

ENV 4001: ENVIRONMENTAL SYSTEMS ENGINEERING
Department of Civil & Environmental Engineering
University of South Florida

Prof. Cunningham

Spring 2012

Lectures: Mondays, Wednesdays, and Fridays, 10:45–11:35 AM, room ENA 105

Credit: 3 units, letter grade

Instructor: Professor J A Cunningham
E-mail: cuning@usf.edu
Phone: (813) 974-9540
Office: ENC (Engineering III) 3215
Office hours: Mondays, 11:45–2:00 (to be held in my office, not in BSN 1301)

Text Book: *Environmental Engineering: Fundamentals, Sustainability, Design*
written by James R Mihelcic and Julie Beth Zimmerman, published by Wiley

Prerequisite: EGN 3353, Fluid Mechanics (grade D or better; may be taken concurrently)

E-Mail: Outside of class, I will use e-mail to disseminate information. This will be done through the Blackboard program so I can reach all students at once. If you use more than one e-mail address, make sure Blackboard forwards to your primary e-mail address.

ENV 4001: ENVIRONMENTAL SYSTEMS ENGINEERING
Department of Civil & Environmental Engineering
University of South Florida

Prof. Cunningham

Spring 2012

Other Text Books that Might Be Helpful

The required text book for this class will be *Environmental Engineering: Fundamentals, Sustainability, Design*, written by James Mihelcic and Julie Zimmerman, published by Wiley. However, students may wish to make use of other text books that are also designed for introductory environmental engineering courses. Of the many such books available, a few of the best known ones are the following. (I will try to put some or all of these on course reserve in the library.)

Environmental Engineering (3rd edition); P Aarne Vesilind, J Jeffrey Peirce, and Ruth F Weiner; Butterworth-Heinemann [TD146.V47 1994]

Environmental Engineering Science; William W Nazaroff and Lisa Alvarez-Cohen; John Wiley & Sons [TA170.N39 2001]

Environmental Science and Engineering (2nd edition); J Glynn Henry and Gary W Heinke; Prentice-Hall [GE105.H46 1996]

Foundations of Environmental Engineering; C David Cooper, John D Dietz, and Debra R Reinhart; Waveland [TD146.C66 2000]

Fundamentals of Environmental Engineering; James R Mihelcic; John Wiley & Sons [GE350.M54 1998]

Introduction to Environmental Engineering; Richard O Mines and Laura W Lackey; Pearson/Prentice-Hall

Introduction to Environmental Engineering (4th edition); Mackenzie L Davis and David A Cornwell; McGraw-Hill [TD145.D26 2008]

Introduction to Environmental Engineering and Science (3rd edition); Gilbert M Masters and Wendell Ela; Pearson/Prentice-Hall

Principles of Environmental Engineering and Science (2nd edition); Mackenzie L Davis and Susan J Masten; McGraw-Hill

This list is still not comprehensive, and students may find other books that cover some of the material of this course. There is nothing wrong with exploring other points of view or other ways of understanding and interpreting the material covered in this course.

ENV 4001: ENVIRONMENTAL SYSTEMS ENGINEERING
Department of Civil & Environmental Engineering
University of South Florida

Prof. Cunningham

Spring 2012

Course Schedule

The course schedule below is tentative. It is subject to change either in pace or in topics covered, although any changes to content will be minor. We will try to adhere to this schedule, but not to the point of detracting from students' learning the material.

Week #	Dates	Topics Covered	Reading	Assignment
Week 1	January 9 January 11 January 13	Course introduction Introduction to environmental engineering Environmental measurements and units	syllabus Chapter 1 Chapter 2	
Week 2	January 16 January 18 January 20	<i>Martin Luther King, Jr., holiday</i> Chemistry for environmental engineering Chemistry for environmental engineering	Chapter 3	
Week 3	January 23 January 25 January 27	Chemistry for environmental engineering Material balances and reactor theory Material balances and reactor theory	Chapter 4	form groups problem set 1
Week 4	January 30 February 1 February 3	Material balances and reactor theory Biology for environmental engineering Biology for environmental engineering	Chapter 5	problem set 2
Week 5	February 6 February 8 February 10	Biology for environmental engineering Risk assessment and management Risk assessment and management	Chapter 6	paper openings problem set 3
Week 6	February 13 February 15 February 17	Risk assessment and management Quiz #1 Water quality and oxygen demand	Chapter 8	Quiz #1
Week 7	February 20 February 22 February 24	Water quality and oxygen demand Water quality and oxygen demand Drinking water treatment	Chapter 10	reference lists problem set 4
Week 8	February 27 February 29 March 2	Drinking water treatment Drinking water treatment Drinking water treatment		problem set 5
Week 9	March 5 March 7 March 9	Drinking water treatment Wastewater treatment Wastewater treatment	Chapter 11	outlines problem set 6
Week 10	March 12–16	<i>spring break</i>		
Week 11	March 19 March 21 March 23	Wastewater treatment Quiz #2 Wastewater treatment		Quiz #2
Week 12	March 26 March 28 March 30	Wastewater treatment Air Pollution Air Pollution	Chapter 12	rough drafts problem set 7
Week 13	April 2 April 4 April 6	Air pollution Air pollution Solid waste management	Chapter 13	problem set 8

continued →

ENV 4001: ENVIRONMENTAL SYSTEMS ENGINEERING
Department of Civil & Environmental Engineering
University of South Florida

Prof. Cunningham

Spring 2012

Course Schedule (continued)

Week #	Dates	Topics Covered	Reading	Assignment
Week 14	April 9 April 11 April 13	Solid waste management Solid waste management Solid waste management		peer reviews problem set 9
Week 15	April 16 April 18 April 20	Topic to be determined (perhaps hydrology and water resources)	to be announced	problem set 10
Week 16	April 23 April 25 April 27	Wrap-up and course evaluations Quiz #3 Course review		Quiz #3
Week 17	April 30 May 1 May 2	Final paper (group project) due, 4:45 PM If possible: q&a session to prepare for final exam Final exam, 7:30–9:30 AM (yes, AM)		final paper

ENV 4001: ENVIRONMENTAL SYSTEMS ENGINEERING
Department of Civil & Environmental Engineering
University of South Florida

Prof. Cunningham

Spring 2012

Class Policies: 1, Grading

- Each student in the class will be assigned a letter grade at the end of the semester.
- Assigned grades can potentially range from A+ to F, or FF for academic dishonesty.
- Plus/minus modifiers will be used as deemed appropriate by the instructor (e.g., A-, B+, etc.).
- Semester grades will be based on a numerical score, computed according to the following:

Group Project:	100 points
Quizzes, 3, in class, each 50 points:	150 points
Final Exam (<i>at time set by registrar</i>):	150 points
Field Trip:	50 points

Thus, the total number of points possible is 450 points.

- Attendance in class does not factor into your semester grade other than helping you to perform well on assignments and exams (i.e., there are no “class attendance points” awarded).
- There will be weekly problem sets posted on Blackboard, but these do not factor into your semester grade. The weekly problem sets are to help you learn the material and prepare for the quizzes and final exam.
- Letter grades will not be assigned based on the common system of 90% earns an A, 80% earns a B, etc. Instead, at the end of the semester, after I compute the semester scores for all students in the class (according to the weighting given above), I determine what score merits an A, B, C, etc. This system is chosen because tests and quizzes are designed to produce a wide spread of grades, which is advantageous for both teaching purposes and evaluation purposes.
- Students who are not used to this system of grading sometimes have a little trouble adjusting because they find it difficult to gauge their performance during the semester. Based on past experience, the grade cut-offs are likely to be *approximately* as follows:

A+ 425 pts	B+ 350 pts	C+ 275 pts	D+ 200 pts
A 400 pts	B 325 pts	C 250 pts	D 175 pts
A- 375 pts	B- 300 pts	C- 225 pts	D- 150 pts

However, I will give you feedback as the semester proceeds so that you can gauge your performance. The numbers given above are meant as a rough guideline only.

- Extra credit is available, as described elsewhere in this syllabus. However, students are cautioned not to over-rely on extra credit to save their semester grades. Extra credit only goes so far; the best way to earn a good grade is to complete the problem sets diligently and thereby learn the material for the quizzes and exam.

ENV 4001: ENVIRONMENTAL SYSTEMS ENGINEERING
Department of Civil & Environmental Engineering
University of South Florida

Prof. Cunningham

Spring 2012

Class Policies: 2, Quizzes and Exams

- There will be three written quizzes throughout the semester, to be taken in class. Tentative dates of the quizzes are provided elsewhere in this syllabus. Any changes to these dates will be announced sufficiently ahead of time.
- There will be a written final exam, to be taken *at the time designated by the registrar*. The assigned time is Wednesday, May 2, from 7:30–9:30 AM. (Yes, you read that correctly, it is 7:30 AM. I am not any happier about it than you are.)
- The format of the examinations (quantitative, qualitative, problem-solving, multiple choice, true/false, essay, etc.) will be left to the discretion of the instructor.
- All examinations will be open-book, open-notes format.
- Laptop computers and other electronic devices *may not* be used during quizzes and exams.
- Students who will not be available for one of the quizzes should inform the instructor far enough *before* the quiz to make alternate arrangements.
- Students who miss an examination unexpectedly (e.g., due to sudden illness, family emergency, or other unforeseen circumstances) must provide documentation or evidence of the reason for missing the exam. It will then be *up to the instructor's discretion* whether a “make-up” quiz will be offered.
- Re-scheduling of the final exam is not possible because the date and time are set by the registrar.
- My intention is to design exam questions such that students who have attended class and have done the homework assignments will be familiar with all the material needed to answer the questions. It will not be my intention to “surprise” you, only to challenge you.
- Generally, exam questions are intended to test the most important concepts of the course. A good exam should require the students to demonstrate their mastery of the material by synthesizing and applying the most important concepts of the course. Exam questions are not likely to test students on their recall of minutiae.

Class Policies: 3, Problem Sets

- I plan to post 9 or 10 weekly problem sets on Blackboard to help you learn the course material.
- Problem sets *will not be graded*. However, I will post my solutions to the problem sets so that you can see how I approached the problems.
- In previous semesters, students’ solutions to problem sets were graded and factored into students’ semester grades. However, I discovered that too many students were simply copying the solutions from previous years’ solution sets, even though this was explicitly forbidden. By making the problem sets ungraded, I eliminate the enticement for anybody to copy previous solutions.
- The reward for doing the problem sets is that they will prepare you for the quizzes and for the final exam (which together comprise 67% of your semester grade). If you devote yourself diligently to the problem sets, you should be well prepared for the quizzes. If you don’t, then you should expect a poor performance on the quizzes.

ENV 4001: ENVIRONMENTAL SYSTEMS ENGINEERING
Department of Civil & Environmental Engineering
University of South Florida

Prof. Cunningham

Spring 2012

Class Policies: 4, Group Semester Project

- There will be a semester project that counts for about 22% of your semester grade.
- Most stages of the semester project will be conducted and submitted by groups. This is for three reasons. First, engineers need to learn how to work in groups, so this is good practice for you. Second, if your group works together well, then each student's workload should be reduced by working in a group. Third, it makes grading more manageable for a class of this size.
- Groups will consist of three or four students.
- All students in the group are collectively responsible for what is submitted by the group. This means, for instance, that students are responsible for making sure that their group members do not conduct plagiarism.
- All students in the group will receive the same grade on any group assignment. If the grade is penalized for any reason (plagiarism, late penalty, etc.), then all members of the group will receive the same penalty. There will be one or two parts of the semester project that will be conducted individually, but most will be submitted by the group.
- Your group may discuss the project with students in other groups. However, any work that your group submits for a grade should have been completed by your group only. Therefore, an acceptable procedure would be to discuss an assignment with another group, but then to complete the assignment within your own group. An unacceptable procedure would be for students in two (or more) groups to complete an assignment side-by-side and then submit work that is essentially the same. If two groups submit assignments that are similar enough to indicate that the work was not completed by each group individually, then *all members of both groups will be penalized*.
- At the end of the semester, you will be given the opportunity to evaluate the other members of your group based on the effort they put forth on the group's behalf. I will take these evaluations into account when assigning semester grades. Students who do not contribute fairly to their groups' semester project will be penalized on those areas of the semester grading formula. Students who go "above and beyond the call of duty" on their group's behalf may be given bonus points in the appropriate areas. Penalties and bonuses will be up to the instructor's discretion, but will be based on the evaluations submitted by the group members.
- Assignments are due *at the beginning of class* on their due date unless otherwise noted. I usually give students a few minutes to get their assignments stapled and submitted. A few minutes into the lecture I will issue a "last call." If you do not have your assignment submitted by the time I issue the last call, then *your assignment is late*.
- Each student group is allowed one late submittal during the semester -- no questions asked. Late assignments must be submitted *by the beginning of the next class after the original due date*. After one late submittal, no late assignments will be accepted from that group *regardless of reason or excuse*.
- More details about the group project will be provided throughout the semester.

ENV 4001: ENVIRONMENTAL SYSTEMS ENGINEERING
Department of Civil & Environmental Engineering
University of South Florida

Prof. Cunningham

Spring 2012

Class Policies: 5, Field Trips

- Typically, three or four class field trips are offered at various times during the semester. Each student must attend at least one.
- Common destinations in previous years have been a drinking-water treatment plant, a wastewater treatment plant, and a waste-to-energy facility (i.e., a solid waste incinerator).
- Attendance is worth about 11% of your semester grade. It is the easiest 50 points you can earn this semester, so you do not want to miss out.
- If space permits, students can attend more than one field trip. However, no extra credit is offered for attending more than one.
- Bus transportation will be provided from campus to the destination, and back to campus. Students are advised to use the bus transportation rather than their own car or transportation, because access to many of the field trip sites is controlled or restricted.
- Field trips typically take about 3 to 4 hours from the time we depart campus to the time we return.
- Field trips will be offered at different days/times (e.g., Thursday afternoon, Friday morning, Friday afternoon), so that each student will be able to find a day/time that is most convenient for him/her and minimizes scheduling conflicts.

Class Policies: 6, Extra Credit

- There is one mechanism by which students can receive extra credit. If you find an article or current news item relevant to this class, submit that item to me along with *complete bibliographic reference information*. (For instance, if you cut an article out of the newspaper, be sure to indicate which paper it is from, what date, what section, and what page number.) If I show your item in class, you will receive 2 points of extra credit.
- The item submitted should be taped neatly to 8.5-by-11 paper. This may require you to trim or splice the item depending on the format in which it was originally printed.
- Depending on what type of projection equipment is available in our classroom, I might have to change the format in which items are submitted, i.e., I might have to require that you scan the item and send me a PDF file. I prefer hard copy, but let's see what kind of projection equipment we have.
- Students can submit more than one item throughout the semester, up to a maximum of 10 points.
- If more than one student submits the same item, and I show that item in class, then each student who submitted it will receive 2 points of credit.
- It is up to my discretion which submitted items will be shown in class.
- Be sure to indicate your name somewhere so that I can award you credit for the item(s) you submit.
- No, you can not earn extra credit by going on more than one field trip.

ENV 4001: ENVIRONMENTAL SYSTEMS ENGINEERING
Department of Civil & Environmental Engineering
University of South Florida

Prof. Cunningham

Spring 2012

Class Policies: 7, Attendance

- Attendance in class lectures is recommended but not required. It is likely that diligent attendance in class lectures will improve your understanding of the course material, and, hence, improve your semester grade.
- Attendance in class does not factor into your semester grade other than helping you to perform well on assignments and exams (i.e., there are no “class attendance points” awarded).
- If you miss class, there is no need to inform me or to provide me with documentation for your absence. (I don’t take it personally, really.) However, I do recommend that you acquire the lecture notes from a classmate.
- If you choose to attend class, I require that you do not engage in behavior that distracts me or that disrupts the class for others in attendance:
 - Please make sure mobile phones are turned off. **NO TEXTING DURING CLASS!**
 - Laptop computers should be used only for taking notes, not for e-mail, web browsing, or any other activity that might distract your classmates or your instructor.
 - Please do not chat with your classmates, read the newspaper, work on homework for other courses, or engage in any other behavior that is distracting to your classmates or to your instructor.
 - If you need to do something other than participate in the class lectures, then please do so outside the classroom.
 - Students who are engaged in such activities in class will be asked to leave.

Class Policies: 8, Office Hours

- Office hours will be held on Mondays from 11:45 AM until 2:00 PM.
- Office hours will be held in my office or in close proximity thereof. You may have heard or read that office hours will be held in room BSN 1301, but this is incorrect.
- The purpose of office hours is for students to discuss with me anything related to the class. This includes, but is not limited to, weekly problem sets and the group semester project.
- If there is high demand for my time during office hours, then I will institute a “sign-up” system because of the large size of the class. In that case, priority for office hours will be given to students who sign up beforehand.
- If the demand is manageable, then office hours will be run on a “walk-in” basis.
- If sign-ups become necessary, then it is OK for more than one student to sign up for the same time slot, as long as all students involved agree to share the time slot. If two students have the same question, it is probably more efficient if the students sign up together for a single time slot.

ENV 4001: ENVIRONMENTAL SYSTEMS ENGINEERING
Department of Civil & Environmental Engineering
University of South Florida

Prof. Cunningham

Spring 2012

Class Policies: 9, Laptop Computers

- Students may use laptop computers for taking notes in class.
- Laptop computers should be used only for taking notes, not for e-mail, web browsing, or any other activity that might distract your classmates or your instructor. If it becomes apparent that a student is using his/her laptop for any of these activities, that student will be asked not to bring his/her laptop to class in the future.
- Laptop computers *may not* be used during quizzes or exams. If you use a laptop computer to take notes, then you will want to print out hard copies of those notes to bring to a quiz or exam.

Class Policies: 10, Academic Honesty

- Any handouts used in this course are copyrighted. “Handouts” means all materials generated for this class, which include, but are not limited to: syllabi, notes, quizzes, exams, in-class materials, review sheets, and additional problem sets. This includes materials that are posted on the web as well as materials distributed in class. Because these materials are copyrighted, you do not have the right to copy the handouts unless the instructor (or other copyright holder) expressly grants permission.
- Students may audio tape lectures for their own private, personal use, or for a classmate who is registered in the class during this semester. Audio tapes may not be sold or distributed to anybody who is not registered in the class this semester.
- No form of scholastic dishonesty (cheating, plagiarism, etc.) will be tolerated. As commonly defined, plagiarism consists of passing off as one’s own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you have permission of that person. This includes copying material from books, reports, journals, pamphlets, handouts, other publications, web sites, etc., without giving appropriate credit for those ideas and/or without identifying material as quotations when taken directly from another source.
- Cheating on homework and exams will not be tolerated. Cheating will be dealt with according to university policy.
- You may discuss project assignments with students who are not in your project group. However, when you prepare your assignments, you must do so without referring to the work of students who are not in your group. Copying assignments from a student outside your group is considered plagiarism. See Class Policy #4, above.
- Violation of these rules – *even unintentionally!* -- can result in disciplinary action including a grade penalty, up to and including an F or FF in the course, suspension, dismissal, and expulsion from USF. If you have any questions regarding plagiarism or other forms of scholastic dishonesty, please consult the relevant sections of the USF student catalogs, and/or ask the instructor.

ENV 4001: ENVIRONMENTAL SYSTEMS ENGINEERING
Department of Civil & Environmental Engineering
University of South Florida

Prof. Cunningham

Spring 2012

Class Policies: 11, USF Statement on Emergencies

In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Blackboard, Elluminate, Skype, e-mail messaging, and/or an alternate schedule. It's the responsibility of the student to monitor the Blackboard site for each class for course specific communication, and the main USF, College, and department websites, e-mails, and MoBull messages for important general information. (Instructor's note: examples of "emergency" could be a hurricane, outbreak of contagious disease, etc.)

Class Policies: 12, USF Statement on Academic Accommodations for a Disability

Students in need of academic accommodations for a disability may consult with the Office of Students with Disabilities Services to arrange appropriate accommodations. Students are required to give reasonable notice prior to requesting an accommodation.

(Instructor's note: The Americans with Disabilities Act is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Office of Services for Students with Disabilities at 974-4309 as soon as possible.)