CVEN 689
“SUSTAINABLE SYSTEMS IN CIVIL ENGINEERING”
SUMMER SESSION II 2006

DEPARTMENT OF CIVIL ENGINEERING, TEXAS A&M UNIVERSITY

Instructor
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Lectures: MTWRF 8:00-9:35 AM, Room CE 203

Format: Course credit hours: 3; Lecture hours per week: 3; Lab hours per week: 0

Prerequisites: None

Text: Readings are specified in the calendar below and will be accessed online through the course website (marked with {w}), or directly at a given URL, or through the TAMU Library electronic collections (marked with {e}). Since class meetings will be mostly spent in discussion on readings, the reading assignments must be read before class. Additional readings may be specified during the semester.

Course Description
Definitions of sustainability and sustainable development from social, economic, political, and technical perspectives; concepts of natural capital, resource fungibility, strong and weak sustainability; industrial ecology; life-cycle analysis; valuation of environmental goods and externalities; sustainable infrastructure design and management.

Grading: Midterm Exam 1 25%
Midterm Exam 2 25%
Review Paper 25%
Term Project 25%

The Midterm Exams will be traditional in-class, individual exams covering sustainability theory. The exact format of the exam (e.g., open versus closed book, etc.) will be specified prior to the exam date.

The Review Paper will require students to read technical literature beyond the assigned course materials, critically analyze the materials, and synthesize an understanding of the role of sustainable development in civil engineering systems (or another field as approved by the instructor) beyond that already covered in class.

The Term Project will involve teams of students performing quantitative analysis of a civil engineering problem (or a problem in another field approved by the instructors) using the tools of sustainability learned in the course. The goal of this project is to demonstrate the possibility for improved engineering practice vis-à-vis current issues utilizing sustainability methods.
Course Website: It’s a good idea to check the course website at least daily for announcements. The website will also be the means by which handouts, some readings, assignments, etc., will be distributed.
http://ceprofs.tamu.edu/kbrumbelow/CVEN689/CVEN689_SSCE_Brumbelow.htm

Course Outline: Below is the tentative outline for the course this semester. Modifications to this schedule may be announced in class or on the course website at any time. Please note the reading assignments and complete them before the relevant class period.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic and Reading Assignments</th>
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<tr>
<td>7/5</td>
<td>Course Introduction</td>
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| 7/6   | The commons and externalities:  
Hardin, G., The tragedy of the commons, Science, 162(3859), 1243-1248, 1968. {e} |
| 7/7   | Natural capital and ecological economics:  
Daly, H.E., From empty-world economics to full-world economics..., 1992. {w} and Costanza, R., The ecological economics of sustainability, ... 1992. {w} |
| 7/10  | Applying natural capital to the case of stormwater engineering:  
| 7/11  | Exercise: Natural capital and stormwater engineering |
| 7/12  | Fungibility and Strong vs. Weak Sustainability:  
Solow, R., Sustainability: An economist’s perspective, ... 1991. {w} |
| 7/13  | Entropy and Thermodynamic concepts in SD:  
Georgescu-Roegen, N., The entropy law and the economic problem, ... 1971. {w} |
| 7/14  | Exercise: Fungibility, entropy, and desalination as a water resource |
| 7/17  | Ethics of sustainable development:  
Engel, J.R., The ethics of sustainable development, ... 1991. {w} |
| 7/18  | Ethics (continued):  
| 7/19  | The key to SD: Technology or Policy?  
| 7/20  | Exercise: Ethics, SD, and construction of infrastructure for refugee camps |
| 7/21  | Midterm Exam #1 |
7/24 Metrics of SD:

7/25 Metrics of SD (continued):

7/26 Life-cycle analysis/SD in Environmental Engineering

7/27 SD in Transportation Engineering

7/28 SD in Construction, Materials, and Structural Engineering

7/31 SD in Construction, Materials, and Structural Engineering (cont.)

8/1 SD in Geotechnical, Dredging, and Water Resources Engineering

8/2 Midterm Exam #2

8/3 SD in Water Resources Engineering

8/4 SD in Environmental and Water Resources Engineering
8/7  Course closure and assessment
8/9  Presentation of 689 Term Projects/489 Review Papers, 8:00-10:00 AM

Official Notices

ADA Statement: The Americans with Disabilities Act (ADA) 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 Department of Student Life, Services for Students with Disabilities, in Cain Hall or call 845-1637.

Academic Integrity Statement: “An Aggie does not lie, cheat, or steal or tolerate those who do.” Students are expected to understand and abide by the Aggie Honor Code presented on the web at: http://www.tamu.edu/aggiehonor. No form of scholastic misconduct will be tolerated. Academic misconduct includes cheating, fabrication, falsification, multiple submissions, plagiarism, complicity, etc. These are more fully defined in the above web site. Violations will be handled in accordance with the Aggie Honor System Process described on the web site.

The handouts used in this course are copyrighted. By “handouts,” I mean all materials generated for this class, which include but at not limited to syllabi, notes, quizzes, exams, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts unless I expressly grant permission.

Cheating on quizzes and exams will not be tolerated. Cheating will be reported and handled in accordance with the Aggie Honor System Process. Some or all examinations will be closed book; “looking at another student's examination or using external aids (for example, books, notes, calculators, conversation with others, or electronic devices)” during these examinations is a violation of Texas A&M Aggie Honor Code, Cheating, unless specifically allowed in advance by the instructor.

Unless specifically allowed in advance by the instructor, all assignments and homework in this class are expected to be completed based on individual effort. Copying the work of others, including homework, is a violation of Texas A&M Aggie Honor Code, Cheating.