

Lafayette College

Course Syllabus

VAST 203 Sustainability of Built Systems

Spring 2011

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X5590 <http://sites.lafayette.edu/raicha>

Lectures: Tuesdays and Thursdays 11:00 – 12:15 in AEC 325
Also modified Thursday schedule for ½ class (2:45 – 4:00 pm in AEC 325)

Office Hours: M 2 – 4 pm; T 3 – 4 pm; W 10:30 am – noon & W 2-3 pm
Other times, open door policy or by appointment

WA: Ioana Marin marini@lafayette.edu

Texts: No required texts; readings provided as needed and include excerpts from books, articles, and other sources. Access to many of these readings will be through links on the course website.

Learning Objectives:

The objective of this interdisciplinary course is to introduce students to the fundamental concepts of sustainability and how it applies to the built environment in both the industrialized and developing worlds. Students will be introduced to the historical, moral, and ethical foundations for the current sustainability movement and learn to apply frameworks to analyze the economic, environmental, and social-equity components of sustainability across the life-cycle of a built system. In this course we consider a built system to be a civil infrastructure product that involves decisions made by different entities in a sequential process from cradle to grave (or birth to death) e.g., a particular building, bridge, water distribution system, etc. As such, the boundaries for a built system differ from those for a construction project versus those for a community project. By the end of this course, students will be able to do the following in terms of a built system:

- Define sustainability as a systems approach and explain its historical origin;
- Describe the sustainable (or unsustainable) components of large-scale systems;
- Apply fundamental scientific principles (biological, physical, chemical) to assess interactions with natural systems;
- Apply fundamental economic principles to explore interactions with the market;
- Apply fundamental humanistic and moral reasoning principles to explore interactions with ethics and public perception;
- Apply a basic life-cycle environmental assessment framework;
- Apply a basic life-cycle cost framework;
- Apply a basic social justice framework; and
- Critique sustainability frameworks (local, national, professional, and global level).

Academic Integrity Statement: “Students are expected to be honorable, ethical, and mature in every regard” No form of scholastic misconduct will be tolerated. Academic dishonesty includes cheating, fabrication, falsification, plagiarism, complicity, and copying homework. It is the student’s responsibility to comply with the *Lafayette College Student Handbook* (www.lafayette.edu/student_life/) and to be familiar with the *Principles of Intellectual Honesty* (www.lafayette.edu/academics/honesty.pdf). Violations will be handled in accordance with the Procedural Standards in Disciplinary Proceedings stated in the *Student Handbook*.

“I give you two examinations, one in trigonometry and one in honesty. I hope you pass them both, but if you must fail one, let it be trigonometry for there are many good people in this world today who cannot pass an examination in trigonometry, but there are no good people in the world who cannot pass an examination in honesty” - Vanderbilt Univ. past-Chancellor Madison Sarratt

Course Topics:

“Sometimes it falls upon a generation to be great” – Nelson Mandela

The course is organized for flexibility. The topics listed below are tentative and may be modified by the instructor during the semester, which will allow us to adjust the amount of time spent on each topic based on class interest and to choose alternate routes in the process of exploring the course topics and building community. Students will be advised in a timely manner of assignments, due dates, and required readings. If you have any questions at any time during the semester, please stop by my office and/or email me (raicha@lafayette.edu).

Introduction:

Overview, Brief History of Sustainability, Brundtland Report, Terminology, & dimensions of sustainability

Sustainability and the Systems Approach:

Systems & their boundaries – stages, decision makers, boundaries, spatial aspects (gate-to-gate, cradle-to-grave, inter-industry, intra-industry, extra-industry). Supply chains & webs as systems. Infrastructure systems

Large-scale Built System Examples:

Water systems, The Klamath River Basin, Transportation Systems, Manufacturing Systems

Exploring the Interaction between Natural and Built Systems:

Breaking the world into spheres. Materials and energy balances. The fate and transport of pollutants. Ecosystems, carrying capacity, and the tragedy of the commons. Toxicology and risk, Klamath River Basin

Life Cycle Assessment:

Process LCA: cradle to grave. Inventory, Impact, Improvement analysis. Industry LCA tools

Exploring the Interaction between Market and Built Systems:

Benefit-Cost analysis. Indirect costs, intangibles, and equity. Sustainability markets, Natural Capitalism and full accounting.

Life Cycle Costing:

Time value of money and equivalence. The law of compound interest. Choosing among alternatives (decision making) using present and future worth analysis, Building systems

Exploring the Interaction between Humanistic and Moral Reasoning, & Built Systems:

The role of morality and ethics (utilitarianism, rule-based). Aesthetics (design for human effect vs. community effect). Public perception. Inter – and Intra-generational equity, Transportation systems

Social Justice Framework/Large Scale Built System Examples:

Environmental and social justice approaches. Environmental racism, Carp, Three Gorges, Natural Gas

Sustainability Legislation, Voluntary Codes and Rating Systems:

NSPE code of ethics wrt sustainability. U.S. Green Building Council LEED (Leadership in Energy and Environmental Design) green building rating system. Energy Star program, ASCE Prime Standard

Grading:

Class Attendance, participation, and leadership:	20%
Homework and in-class assignments:	20%
Writing Assignments:	30%
Semester Project:	30%

Class Participation and Leadership: Your learning will take place both during and outside of formal class times, including field trips. Reading assignments must be completed prior to the class during which they will be discussed. You are expected to participate during class discussions in addition to asking and answering questions and to work effectively with your colleagues on any in-class activities.

Homework / Assignments: Homework and in-class assignments will require a mix of reading, writing, and calculations. All assignments should be completed in a professional manner and are due at the beginning of class on the due date. Unless previous arrangements are made, late homework will receive a grade of zero.

Semester Project: In addition to several writing assignments throughout the semester, the course will include a major term project consisting of several stages. The semester project will focus in more detail on sustainability as it applies to a particular built system(s). Each student will prepare a report of approximately 10-15 pages that includes a) background, b) extent of sustainability focus, c) data sources and quality references, d) description of each aspect of sustainability assessed, e) details of the sustainability assessment performed, f) applicable codes, laws and policies, g) the broader context for this built system, and h) conclusion. The paper will provide a chance for you to strengthen your general thinking, organizational and written communications skills. Each student will meet with the VAST Writing Associate twice for this assignment – once early in the process (during Week 8) to discuss the approach and organization as well as the drafts of initial sections, and subsequently to review a complete draft of the document (during Week 12). More information will be provided later in the semester.

Required Writing Associate Meetings: To help integrate the study of writing in courses throughout the curriculum, Lafayette established a College Writing Program (CWP). CWP provides individualized instruction to help you identify potential writing problems before your professor reads a paper. You will meet with a Writing Associate (WA) four times this semester. The WA assigned to this course is Ioana Marin. She will meet with each of you in conferences to discuss drafts of your written work and engage you in conversation about your writing so that you can revise it effectively. Each of you will meet with Ioana out-side-of class four times this semester, with each conference typically lasting about 30 minutes. The weeks that the meetings will take place will be announced in advance (usually a week before the assignment is due). All students, regardless of their writing abilities, should benefit from working with the WA, and therefore you are required to participate. Ioana is obligated to inform me of any late or missed meetings. If you miss a meeting your assignment grade will be reduced by 10 points. WA Drop-in hours for any Lafayette Students (No appointment is necessary) are held Sun.–Thurs., 6–9 pm, Pardee 319. For more information look at <http://sites.lafayette.edu/collegewritingprogram/about>.

Standards of Academic Honesty in Written Work:

Whether you are in class, completing written assignments, or working on homework, you are expected to display the ***utmost academic integrity***. This means that all written assignments must be solely your own work, the work of others must be cited correctly, and that you avoid misrepresenting the truth at all times. The issue of plagiarism and how to avoid it is important in all your classes that involve writing, including this one. Cases of plagiarism or unauthorized collaboration with others will constitute an act of academic dishonesty, as outlined in the Lafayette College *Student Handbook*, and will be dealt with according to College policy. Students are sometimes found guilty of academic dishonesty even when the act was committed unintentionally. Please understand these policies.

Because all intellectual work builds on the ideas of others, it is essential to ***provide appropriate citations to the sources you consult, whether they are paraphrased or quoted directly***. Since scientific, fact-based papers are strengthened by the use of expert sources of information, you should seek out sources that strengthen your arguments or that argue other ideas or positions in your work. Every source needs to be cited in the paper in the text itself wherever information from that source is paraphrased or quoted. See *The St. Martin's Handbook* for proper MLA citation format. As you perform research and track down sources be sure that you collect enough information about the source (author, title, publication, date, etc.) so that it is easy to cite the source in your draft and final papers. If you are not sure of what is expected concerning citations, or what constitutes academic dishonesty, please ask me before proceeding.

Students with Disabilities:

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 or require assistance with academic concerns/accommodations, please contact the Office of the Dean of the College (610-330-5080) at Lafayette.

Course Communication:

E-mail will be used to communicate information about the course and any course cancellations. Also, there is a

web site set up for this course sites.lafayette.edu/raicha that will provide some assignment and reading details.