



15.992 LABORATORY FOR SUSTAINABLE BUSINESS “S-LAB” (H2)
Spring 2009
Tuesday, Thursday 2:30-4 pm
E51-325

Professors: Rebecca Henderson, Richard Locke, Sarah Slaughter, John Sterman
Teaching Assistants: Laurel Hoffman, Rahul Kitchlu, Jon Potter,
Course website: <http://stellar.mit.edu/S/course/15/sp09/15.990/index.html>
Office Hours by appointment

Introduction

Sustainability offers new opportunities to transform markets, systems, and countries. It also provides the prospect that firms and organizations can operate in sustainable ways and also play a positive role in the regeneration of the planet and the support of human health and welfare. Building on the understanding of sustainability strategies in **15.990 (H1- prerequisite)**, in this course the S-Lab student teams will work with host organizations on their actual sustainability projects. Host organizations, which can include large or small companies, non-profit institutions, and government agencies, set the project focus -- that is, S-Lab teams work on real issues or problems that the host organizations want to address. Previous S-Lab hosts include Intel, Disney, Nestle, GreenFuel Technologies, GoLoco, Coldpack, Healthcare Without Harm, University of Sao Paolo, and the New England Clean Energy Council.

We have found that many organizations address the opportunities for sustainability within the following Areas of Influence:

- HOW organizations function – Sustainable Operations, specifically improving the sustainability of their facilities and infrastructure, operations, and supply chain.
- WHAT organizations provide – Sustainable Product/Service, specifically modifying existing or developing new sustainable services or products, and addressing the end-of-life aspects of their products.
- WHERE organizations operate – Sustainable Communities, specifically aiding in the strengthening and development of sustainable communities in which they operate or from which they obtain resources (also known as “working outside the fence line”) in social, financial, commercial, environmental and political systems.

We will discuss current methodologies for sustainability analysis and measurement and, through in-class simulations and peer presentations, examine the diversity of organizational approaches to sustainability.

Readings:

Readings include a combination of analytic articles and company case studies drawn from a variety of different industries. Class readings, articles, class notes, slides, and other resources related to the course will be posted on the Stellar course web site (<http://stellar.mit.edu/S/course/15/sp09/15.990/index.html>). Please check this site regularly.

Requirements

The requirements for the course and the contribution of each towards the final grade are:

- | | | |
|----|----------------------------------|-----|
| 1. | Class Participation & Attendance | 30% |
| 2. | Project Work Plan | 20% |
| 3. | Final Report and Presentation | 50% |

S-Lab Projects and Teams

The goal of each project is for your team to professionally and effectively deliver analysis, advice and recommendations that are immediately useful to your host organization. You will make a formal presentation to your host near the end of your project and provide them with supporting written analysis and data as appropriate.

We posted the project proposals on the course web, and students are expected to review the proposals and post their project preferences and interests during 15.990 (H1) to initiate team formation. There will be a **project mixer in early March** to form teams for the projects. When you form your S-Lab team, you should aim for four (4) students, with no more than 2 students per team from the same program, and focusing on building a strong mix of skills and experience.

Projects Bids are due on March 9, 2009. Each team will bid on its top three (3) projects. Based on the interests and capabilities of the teams, the faculty then matches the team with a host organization, and the host organization then decides whether to accept the team. Team matches to host organizations will be completed by March 13, 2009.

We expect that if you submit a project bid you are committing to stay in the course through the completion of the project. If you don't submit a project bid, we will assume that you are dropping the course.

1. Work Plan

Each team will have a faculty member serve as the advisor for all aspects of the project. It is your team's responsibility, however, to negotiate and manage all aspects of the work plan and the project. **Your detailed work plan is due on April 7, 2009.** The work plan is essentially a contract between you, your team, the hosts, and the S-Lab faculty for what you will do—both the product that you will share with the hosts and the faculty, as well as the key steps you will take to generate that product. It sets out an agreement to which you are expected to adhere.

The work plan should contain:

1. Clear, concise problem statement – enables your team to understand the host's objectives for this project.
2. Description of the key deliverables – aligns expectations between your team and the host.
3. Detailed description of tasks to accomplish work, with the assignment of those tasks to specific people – align expectations within the team for the completion of the project
4. Detailed timeline for tasks (start and completion) - to track your own progress over the project.

The work plan provides the framework for the Final Report.

2. Final Report and Presentation

We are targeting a long-term impact for your S-Lab project reports. We are most interested in making your Final Report publicly available to advance the field as a whole. The Final Report for your S-Lab host organizations should contain:

1. Objectives of the project
2. Background information and analyses
3. Results (including methodologies and tools developed by the team)
4. Specific modifications that reflect the objectives, strategy, concerns of the host organizations.
5. Possible: direct application to a host organization's specific data (as demonstration of feasibility, back-up for specific recommendations, etc.)
6. References to relevant research, best practices, industry standards, etc.

The Final Report can be seen as providing a "user's manual" for the host organizations going forward. As such, they need to be professionally written and clearly represent where the information came from, and how it will need to be modified going forward to reflect dynamic conditions. You have the opportunity to make a substantial contribution to the host organizations - and the field in general - through your projects. We have confidence that you will make that contribution.

You will deliver a **draft of your Final Report to your host organization and faculty adviser by May 7, 2008**. Your team will also create a **poster that describes your project for the May 12 S-Lab Day** for presentation to the MIT community and host organizations. The **Final Report, with Poster and/or Presentation, is due on May 14, 2008** to your host and faculty adviser.

Please Note: If confidential information is included in the Final Report to the host organization, please also submit a version of the Final Report without this information to your faculty adviser that could be publicly released.

The final report should be no more than 20 double-spaced pages of text, plus any tables and appendices that help the reader.

3. Participation and Attendance

We have designed this class as an integrated whole, and if you miss class it makes it very difficult to maintain a coherent conversation. You'll miss ideas and concepts – many of them raised by your colleagues -- and you'll have a more difficult time contributing to the discussion. If for some reason you are forced to miss class, please let the teaching assistants know in advance. If you miss one class, you will get 10% of your grade deducted; 2 classes, 20% of your grade reduced; 3 absences = automatic failure. Of course, for illness, family emergencies, job interviews, etc., we would grant an excused absence, in which case you will have to write a 300 word contribution to the S-Lab discussion pages on the current topics to replace your contribution in class.

DUE DATES:

March 9 – Team Bids on Proposals

[March 13 – Team/Host Match]

April 7 – Detailed Work Plan

May 7 – Draft Final Report

May 12 – Poster for S-Lab Day

May 14 – Final Report

I. **Introduction and Overview** March 31

Lead Faculty: Prof. Slaughter

How can a company develop a systematic approach to its sustainability activities? What are the current methods and theories? This session will introduce the project-focused portion of the course, looking at specific concepts that can be used to develop an organization's sustainability strategy. Using brief examples from previous S-Lab projects, we will discuss the general categories of sustainability projects, including Sustainable Operations/Supply Chains, Sustainable Products/Services, and Sustainable Communities. We will also review several current and emerging fields, including Industrial Ecology, Product-Service Systems, and an overview of specific methodologies.

Required readings:

Strategy & Society: The link between competitive advantage and corporate social responsibility, Michael Porter and Mark Kramer, **Harvard Business Review**.

II. **Sustainability Metrics and Methodologies**

Lead Faculty: Prof. Slaughter

Class 2. Life Cycle Assessment, Ecological Footprint April 2

What exactly is meant by “embodied energy”, “carbon footprint”, and “ecological footprint”? How are these levels measured and what are the strengths and constraints of these methods? How are they actually employed by companies and organizations to accomplish specific objectives?

Required readings:

Note on Life Cycle Analysis, Susan Svoboda, **Pollution Prevention in Corporate Strategy**, University of Michigan, 1995.

Strategic sustainable development – selection, design, and synergies of applied tools, Roberts et al., **Journal of Cleaner Production**, 10 (2002) 197-124.

Class 3. Material Flow Analysis and Material Input per Unit Service April 7

Due: Detailed Project Work Plan

How can companies look at everything that goes into their product or service? How do they decide what to include or exclude, and why does it matter? What is “dematerialization” and how it is measured and implemented for a specific company?

Required readings:

Review of ecodesign and environmental assessment tools and their appropriateness for electrical and electronic equipment, Nicole Unger, **Progress in Industrial Ecology**, 5 (2008) 1-1, 13-29.

State-of-the-art in product-service systems, Baines et al., **Journal of Engineering Manufacture**, 221 Part B (2007) 1543-1552.

Recommended readings:

Measuring Sustainability: A Framework for Private Sector Investments,” International Finance Corporation, World Bank, 2003.

III. Climate Change Negotiation – Simulation (Classes 4-5)

Lead Faculty: Prof. Sterman

In-class simulation and discussion April 9

In-class simulation and discussion April 14

IV. Team Project Presentations (Classes 6-10)

Lead Faculty: Prof. Slaughter

What are the other teams doing? How are they framing the problems, and what is the state of knowledge or best practice in this area? What are the specific concerns or capabilities of their host organizations?

In each of these sessions, several teams will be selected to provide a brief (10 minute) description of their projects – problem statement, key deliverables, results to date, and specific application to the host organization as a basis for class discussion and questions. Each presenting team should provide 1 reference article on their topic for background readings for the class. These articles will be posted on the course website, and will be recommended readings.

Team Presentations and discussion April 16

(Patriot’s Day – No Class – April 21)

Team Presentations and discussion April 23

Team Presentations and discussion April 28

Team Presentations and discussion April 30

Team Presentations and discussion May 5

V. Sustainability Start-Up – Simulation (Class 11) May 7

Lead Faculty: Prof. Sterman

Due: Draft Final Report

VI. S-Lab Day May 12

Each team will create a poster that clearly presents their S-Lab project, including problem statement, state of knowledge or best practice, results, and specific application to host organization. The poster session is open to MIT community, host organizations, and interested parties.

VII. Wrap-up and Reflection May 14

Due: Final Report