BUSINESS AND THE ENVIRONMENT

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Course Description:

Environmental product differentiation opens new markets. Green procurement and total quality environmental management significantly reduce input and operating costs. Product innovation and eco-entrepreneurship are ways of doing well while doing good. These are some of the opportunities.

The cost of landfilling in the US is increasing rapidly. Communities are demanding higher standards of air, water and soil quality. European and Japanese legislation on product take-back and waste exports concerns many US manufacturers. Rising fuel prices make fuel-efficiency a competitive factor. These are some of the challenges.

This course takes a holistic view of the interaction of businesses with the environment. It outlines reasons why businesses would want to care about environmental issues, introduces environmental assessment and management tools, and visits topics from various business functions. The main topics that will be covered are:

- The science underlying environmental issues
- Relevant domestic and international environmental legislation
- Environmental assessment and management tools
- Corporate environmental programs
- Environmental operations
- Closed-loop supply chains
- Environmental Marketing
- Sustainable Development

Who Should Take this Course?

If you've ever asked "What do I need to know about environmental issues to make my company more successful?" this course is for you. And if you haven't, maybe this is the right time! There are many reasons to care about how businesses interact with the environment – from the basic (cost reduction, compliance) to the inspiring (entrepreneurial opportunities), and this course will get you started on identifying and capitalizing on these opportunities.

Readings

There are no required textbooks for this course, but below are a partial list of reference books and popular environmental books that we will draw on in class. Complementary material such as case studies and articles will be included in the course pack.

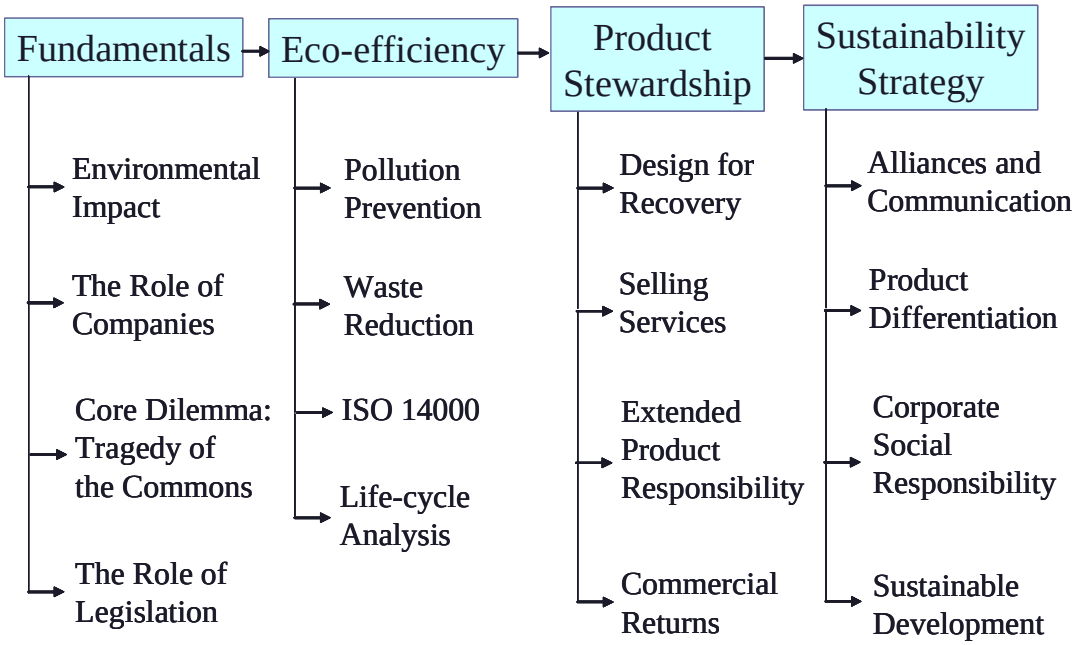
Silent Spring, Carson
Ecology of Commerce, Hawken
In Earth's Company, Frankel
Enviro-Capitalist: Doing Good While Doing Well, Anderson and Leal
Cannibals with Forks, Elkington
Capitalism at the Crossroads, Hart
Industrial Ecology, Graedel and Allenby
Environmental Economics: An Elementary Introduction, Turner, Pearce and Bateman
Measuring Corporate Environmental Performance, Epstein
The Skeptical Environmentalist, Lomborg
Mid-course Correction, Anderson

Guest speakers

We will have a number of guest speakers throughout the semester who will share with us the opportunities and challenges their company was involved with regarding environmental issues.

Flow of the Course

The course consists of four modules, as depicted below. A detailed outline of the sessions follows.



COURSE OUTLINE

#	Date	Topic	Format
1	1/10	Introduction	Lecture
Module 1 : Fundamentals			
2	1/12	Environmental Impact	Lecture
3	1/17	Corporate Environmentalism	Lecture
4	1/19	Environmental Economics	Fish Banks, Ltd. Simulation
5	1/24	Environmental Economics	Simulation debrief
6	1/26	Environmental Legislation	Lecture
7	1/31	Environmental Legislation	Guest speaker: PJ Newcombe, P2AD
Module 2: Eco-Efficiency			
8	2/2	Corporate Environmental Programs	Guest speaker: Joe Brister, Environmental Affairs, Michelin North America
9	2/7	Pollution Prevention & Waste Reduction	Case - Allied Signal: Managing the Hazardous Waste Liability Risk
10	2/9	ISO 14000	Case - International Hardware Products: Considering an ISO 14001 EMS
11	2/14	Life-Cycle Analysis	Lecture
12	2/16	Environmental Risk Assessment	Case - Environmental Risk Management at Chevron Corporation
13	2/21	No class	
14	2/23	Midstream Project Presentation	Groups TBD
15	2/28	Midstream Project Presentation	Groups TBD
Module 3: Product Stewardship			
16	3/2	Design for Recovery	Case - Xerox: Design for the Environment
17	3/7	End-of-Use Management	Guest speaker: John Wuichet, Army IM Agency
18	3/9	Service Contracts	Case – Interface's Evergreen Services Agreement
19	3/14	Dematerialization	Guest speaker: TBD, Interface, Inc.
20	3/16	Commercial Returns	Case - Managing Product Returns at HP
Module 4: Sustainability Strategy			
21	3/28	Alliances and Communication	Case - McDonald's and the Environment
22	3/30	Environmental Product Differentiation	Case - Environmental Product Differentiation by the Hayward Lumber Co.
23	4/4	Green Build	Guest speaker: TBD
24	4/6	Corporate Social Responsibility	Case - The Body Shop International
25	4/11	Sustainable Development	Case - Sustainable Development at Shell
26	4/13	Sustainability in a Public Institution	Guest speaker: Dr. Carol Carmichael, Director, Georgia Tech ISTD
Your turn!			
27	4/18	Final Project Presentation	Group TBD
28	4/20	Final Project Presentation	Group TBD
29	4/25	Final Project Presentation	Group TBD
30	4/27	Final Project Presentation	Group TBD

Course project

The project is an exciting opportunity to work closely on a current business issue. I have determined several projects in collaboration with specific companies and organizations that are looking forward to working with you; a full description of the projects is given at the end of this document. You are free to develop your own project as well.

Canvas Systems:	Developing a total cost of ownership argument for IT equipment replacement
Georgia Tech:	Developing an end-of-life disposal program for IT equipment
Michelin North America:	Assessing TWEEL (new Michelin tire technology) environmental impact in the use and post-use phases
Army Installation Agency:	The business case for leasing versus buying
Int'l Sleep Products Assoc.:	An evaluation of recovery systems for the mattress industry

The deliverables of the project are a final report, an in-class presentation, and a presentation to stakeholders. Where possible, we will combine these two presentations. There are no restrictions on report length, but it should be professional, and include an executive summary. You may also choose to deliver other supporting material (spreadsheets, etc.) to the stakeholders where suitable.

Projects will be conducted in teams of 3 students. To provide an interdisciplinary experience, I would like each team to have a mix of disciplines included.

Due Dates

January 16, 5pm: Submit a preference-ordered list of all the projects you would potentially like to work on. I will try to come up with an assignment that is equitable and has a mix of backgrounds represented.

January 25, 5pm: After having talked with company contacts to better understand the context, turn in a work plan for the semester with individual responsibilities. If you are unable to meet with the contacts in the meantime, this date can be changed.

Feb. 23 and 28: 40-minute in-class progress update presentations and discussion.

April 18-27: In-class presentations. If it's OK with all, and we can find a room, we might choose to meet 11-1:30 on April 25 and 27 and have two presentations per session, all in the same week.

April 28: Final report due.

Assignments

There are two individual assignments. You can either write a 5-page report on each (not including references and appendix), with Assignment 1 due in class on March 30 and Assignment 2 due in class on April 6, or you can write a 10-page deeper report on Assignment 1 only, due in class April 6. In the first case, each assignment is worth 10% of the grade; in the second case, the assignment is worth 20% of the grade.

Grading: Your assignment grade is based on four components: (25%) *breadth and depth of research* (the quantity and quality of material you find concerning your topic); (50%) *quality of analysis*; (25%) and *quality of writing* (including proper citations).

Format: Use one-inch margins on all sides, single space within paragraphs, and double space between paragraphs. Provide section breaks – use section titles and subtitles. Please provide citations for any outside materials used to avoid accidental plagiarism. If you're not sure about what plagiarism is, you can find out from the web (e.g. http://gervaseprograms.georgetown.edu/hc/plagiarism.html)

Assignment 1: Is Leasing Green? In addition to the conventional convenience and financial advantages of leasing, there have been recent claims that leasing is beneficial for the environment (Hawken 1994, Fishbein et al. 2000). In this assignment, I would like you to develop arguments for and against leasing in terms of its environmental impact, and develop a framework for under what product and market conditions you believe it would be most beneficial.

Fishbein, B. K., L. S. McGarry and P. S. Dillon (2000). "Leasing: A Step Toward Producer Responsibility." New York, NY, Inform, Inc.

Hawken P. (1993). *The Ecology of Commerce: A Declaration of Sustainability,* HarperCollins Publishers, New York, NY.

Assignment 2: Corporate Social Responsibility. Your assignment consists of answering the following questions based on the Body Shop case. Please prepare a thorough analysis using the information contained in the case, outside information that you generate, and pertinent material from our class.

1. How has The Body Shop become such an outstanding success while defying proven industry norms and strategies? What are the most important sources of its success?
2. How do you evaluate Anita Roddick's management philosophy and style? How important a contribution did she make to the creation of The Body Shop? How important is her role in its ongoing success?
3. What lessons are there to learn from The Body Shop as a corporate model and from Roddick as a model of management? To what extent is this a unique and eccentric approach and to what degree are the challenges to a mainstream practice valid and generalizable?
4. How sustainable is The Body Shop's success? In particular, what should Roddick do about the emerging problems and expected difficulties of developing its operations in the United States?

Grading

Your grade will be based on three items, weighted as follows:

- Individual assignments: 20%
- Group project: 50%
- Class participation: 30% (half of this grade is determined by attendance). You can do one optional in-class presentation (1 slide, 5 minutes) on a topic, book, company, NGO, etc. of your choice to count towards your participation grade.

PROJECT DESCRIPTIONS

What are the costs of not finding a Green solution to IT disposal?

Project sponsor: Steve Hyser, IT Lifecycle Management, Canvas Systems

Businesses continue to upgrade, replace, or make obsolete their IT infrastructure. No matter what the reason for IT replacement or displacement, there are associated costs. Obvious costs include the capital expenditure of purchasing new equipment and the costs of resource training to best utilize new technologies. Costs that are not so obvious include the costs to dispose of old equipment when the new arrives - recycling, facility removal, etc. Potential costs to a business include the costs associated with not disposing of IT properly.

Canvas Systems proposes a project to analyze and develop a cohesive go-to-market strategy. Specifically, a strategy that outlines how working with Canvas can provide businesses with a smarter / less expensive way to manage their IT asset's total cost of ownership wrapped around an ewaste-friendly overall plan.

Some questions that will need to be answered are:

What are IT lifecycle costs and how does a business keep this cost to a minimum without becoming an e-waste contributor? How can this be quantified? What are the factors? How can these factors be presented to businesses in such a way that end of life IT is part of any new IT purchase decision? Does it make sense for businesses to sell their IT while it still has value in order to avoid having to dispose? When is the optimal time to do this in the IT lifecycle?

Information about the company: Canvas Systems is the world's largest independent reseller of used IT. Businesses that use Canvas Systems as their supplier of IT regularly experience savings of 50% or more off the current list price of the new equipment equivalent. Canvas acquires its used equipment for resale through a variety of sources.Examples include End Users who or consolidating or replacing IT, IT Leasing Companies needing a partner to remarket end of lease equipment, and manufacturers who experience excess IT runs. Specific services available from Canvas include used IT resale, rentals, leasing, consignment services, and asset disposal services.

Deliverables: A report analyzing total cost of ownership for various IT equipment and usage time scenarios.

Anticipated learnings: An understanding of end-of-life options for IT equipment. An understanding of the total cost of ownership concept. Environmental impact of IT disposal. An understanding of the competitive elements in the IT sector.

Analysis of Tweel Assembly Life Cycle

Project sponsors:
Ralph Hulseman, External Research Director, Michelin Americas Research and Development Corporation
Joe Brister, Environmental Manager, Michelin North America

Objective: Conduct a preliminary life cycle analysis of Michelin's Tweel assembly to determine the key sustainability issues associated with this product design, cost and environmental impact and compare it to a similar sized radial passenger tire. There are four stages to a product life cycle: raw materials preparation and transport; fabrication and distribution of the fabricated product; use of the product; and, end of life disposal or re-use of the product. This study will focus on the usage and end of life phases. Where possible the Eco Indicator 99 methodology should be used as a standard for comparative evaluation.

The goal is to understand what areas merit further detailed investigation and to have insight into the product design, product usage, and product end of life and their relationship to sustainability of the environment and the business such that Michelin may successfully bring the Tweel assembly to market.

Background: Tweel™ technology, developed at Michelin Americas Research & Development Corp. in Greenville, SC, embodies resilient, structurally supported non-pneumatic tire technology and provides the ride characteristics and advantages of pneumatic tires while improving wear, performance, and maintenance characteristics. The key enabling innovation is the patented "shear ring" technology, which provides a uniform footprint pressure distribution and transfers this footprint load to the hub in the same manner as the hoop of a bicycle wheel. There are many structures that can be used to connect the shear ring to the rim. However, the current embodiment of the technology uses flat vane-style spokes, composed of flexible polyurethane, that encompass the entire width of the tire, transferring the load in the shear ring to the hub in tension. The resulting combined tire and wheel is called the Tweel™ assembly.

A number of sustainable development questions must be answered while developing Tweel™ technology for the passenger car market since the product incorporates designs, materials and fabrication processes little known in the tire industry. Over 86% of radial tires were reused or recycled at their end of life in 2004 in the US which is one of the highest rates of any consumer product[1]. The Tweel assembly can be designed as a one piece wheel, spokes, shear ring and tread or it can be designed to be disassembled or re-treaded. Design trade-offs must be explored to determine whether it is better to

[1] Personal communication from Joe Brister of Michein from information from Rubber Manufacturers Association.

maximize wear life, rolling resistance, traction and handling, or factors such as ease of recycling and health safety during manufacturing and the implications of these trade-offs on profitability and the business model must be understood.

Deliverables: A written report and oral presentation of the usage and end of life phase of the life cycle analysis of Michelin's Tweel assembly including comparison to a similar sized radial passenger tire. The major issues concerning design trade-offs, impact on cost and the business model, and end of life disposal and re-use strategies should be identified. End of life re-use and disposal strategies should be compared to those used for radial tires. Co-disposal with tire recycling streams should be evaluated. A road map should be prepared showing further investigation needed to ensure that Michelin's Tweel technology represents a major step forward in sustainable development of mobility.

Reviewing and analyzing current Georgia Tech surplus policies and procedures for electronic equipment and recommending process improvements that incorporate the entire supply chain.

Project Sponsors:
Tom Pearson, Director, Procurement Services, Georgia Tech
Judy Whitfield, Associate Director, Procurement Services, Georgia Tech

Georgia Tech Procurement Services would like the project team to review Georgia Tech processes for managing the surplus electronic equipment and to propose a blueprint for improving on the status quo and communicating it to various stakeholders.

There will be several elements to the analysis:

1. Georgia Tech is a public university that is required to follow state legislation for disposing of surplus electronic equipment. Some of this legislation is evolving, for example, it's been augmented recently with homeland security considerations. Procurement Services would like to make sure that their processes and the actual implementation of these processes are, at a minimum, in compliance with state law. They would also like the team to investigate and propose other options to go "beyond compliance" to minimize the environmental impact of surplus electronic equipment.
2. Electronic equipment is a fairly big budget item for Georgia Tech – the business volume with Dell only is $8M, for example. The team would develop a proposal to increase the value extracted from disposing of this equipment. Some companies (e.g. Dell) offer contracts whereby they take back surplus equipment, so the end-of-use considerations can be profitably incorporated into the procurement process.
3. Successful implementation of existing end-of-use policies vary widely from organization to organization. The team would also make a recommendation on how to structure the end-of-use process and how to communicate it to the various stakeholders at Georgia Tech to increase the likelihood of it functioning as designed.

Deliverable: A final report detailing an analysis of the above elements and providing recommendations.

Anticipated learnings: Understanding of state legislature relating to the topic. Understanding economics of managing end-of-use equipment in organizations. Benchmarking end-of-life practices in other organizations/industries. Understanding what it takes to roll out an initiative in a decentralized organization. Developing a communication strategy that involves an environmental component.

Analyzing the viability of a product recovery system for used mattresses

Project sponsors:
Mr. Ryan Trainer, International Sleep Products Association
Mr. John Wuichet, Army Installation Management Agency, Southeast Region

Used mattress disposal is a growing problem. From the perspective of high-volume users such as the Army Installation Management Agency, increasing landfill fees and the lack of recycling options are proving costly. From the perspective of mattress manufacturers, third-party "renovators" who collect used mattresses and misleadingly resell them to unsuspecting consumers as "new" product create consumer deception, health, product safety and image issues. Consumer difficulty in some areas in disposing of used mattresses can also be an impediment to them buying new replacement products. For some of the challenges and industry dynamics, see http://www.sleepproducts.org/Content/ContentGroups/BEDtimes1/20031/May/Two_new_recycling_ventures_underway.htm

One option that manufacturers in other industries have considered in order to reclaim value from their own used products and to help facilitate responsible end-of-product-life disposal is leasing, whereby they maintain ownership of the product. Leasing builds into the commercial transaction "up front" the used product recovery service that would be triggered when the mattress is discarded. Industries where this commercial model has been successful include autos and other vehicles, copiers and other office machines, and computers. Interface is seeing success with leasing Carpet. While no mattress producer leases its product today in either the residential consumer or the large institutional (government purchases, hotels, hospitals, dormitories, etc.) markets, it is possible that leasing might be relevant in the institutional market. This and related concepts (such as the concept of collecting a return deposit or recycling fee at point of sale, discussed more below, which might be relevant in the residential consumer market) would be worthwhile to investigate.

Some issues that the students should consider would include:

A. What capabilities do mattress manufacturers (or a designated third party, such as a retailer network or a recycling operator) need to lease and recover their product?
B. How would you recommend structuring lease terms?
C. Under what conditions is leasing desirable for purchasing institutions?

Some issues to consider in this analysis are logistics, market prices for recoverable scrap, the cost and attractiveness of "alternatives" such as landfill costs and structural incentives such as depreciation.

The second option for the industry is to ensure that used mattresses are recycled. According to Mr. Trainer of International Sleep Products Association (ISPA), since there is no established collection and disposal system, the question is whether some type of "return deposit" or product recovery fee collected at sale work would for mattresses. This is a complex concept that the industry has considered on occasion, but hasn't had the resources or ability to do the policy analysis necessary to make an informed decision

of whether such an approach is good or bad. There are several good working models that could be considered: bottles and cans, batteries, tires to name a few.

Some issues that the students should consider would include:

A. How would the process work? That is, would the funds be deposited in a trust account with a government agency for dispersal when the product is recovered? What documentation would be required to prove sales on which the deposit or fee is due? Who would pay or collect that money in the first place? The manufacturer? The retailer? What would be the appropriate administering authority? How would a recycler document mattress recovery to qualify for funds?
B. A cost estimate of what to charge, how much to pass on to the recycler, estimated administrative fees.
C. What are the pros and cons of a voluntary system vs. a mandatory system? State vs. local? What legal authority would be required for a mandatory program?
D. To balance out the costs, what would the benefits be?

An understanding of each of the existing deposit/disposal fee examples would be useful as benchmarks, as they vary widely in scope and details, and should provide insights on a number of these issues.

Deliverable: A final report detailing an analysis of the above elements and providing recommendations.

Anticipated Learnings: Understanding the stake that manufacturers have in the after-use market and the impact of after-use competition. Understanding the lease versus sell decision from the perspective of the lessor and the lessee. Ability to price a lease contract. Understanding the structure and management of collection systems.