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Tuesdays and Thursdays 09:00AM - 10:20AM Rm 1034, LSK Bldg

## **SOSC 2170: ENVIRONMENT AND BUSINESS**

### **AIMS**

1. Develop an understanding of the impact of business activities on the environment.
2. Analyze the environmental, socio-economic and regulatory context within which business must develop an effective environmental strategy.
3. Develop the capacity to evaluate business caused environmental impacts and to generate solutions.

### **INTENDED LEARNING OUTCOMES**

By the end of the course, students should be able to

- Explain the environmental challenges confronting business including global warming, resource conservation, environmental and biodiversity destruction, and health impacts;
- Develop corporate sustainability strategy by analyzing and responding to different social demands and policies and regulations;
- Analyze business impacts through the use of environmental assessment tools such as lifecycle analysis;
- Design a product strategy to reduce environmental impacts through the lifecycle;
- Implement design requirements throughout the different functions of a company;
- Critique alternative design strategies.

### **ENVIRONMENT AND BUSINESS: AN INTEGRATING APPROACH**

The environmental crisis is a design challenge. Until recently all the goods and services made by business did not take into account the impact they would have on the environment when they were being made, used, and thrown away. The degradation of our environment means that we have to integrate environmental performance into all aspects of all products.

Every product has diverse environmental impacts throughout its lifecycle. We have to understand these impacts and how they can be eliminated while still retaining the function of the product. To design for the environment you have to integrate different technologies and practices into the product; a company has to integrate different activities and talents; and the product has to be integrated into the physical environment and into the socio-economic environment. Design for the environment is more than technological challenge, it is a management and political challenge.

The course offers an overview of how a company's environmental response can be integrated within the company and coordinated to work with other companies, the

government and society in order to make great advances in environmental performance.

- The first part of the course looks at the forces compelling companies to respond to environmental needs. We review the main environmental problems, and then investigate how society, politics, economics and technology shape the responses of companies to those environmental problems.
- The second part of the course introduces industrial ecology and design for environment (DfE). Industrial ecology is a system for minimum energy and material loss throughout the lifecycle of a product, and also describes transformations needed to business, political and economic principles and practices. Design for environment integrates a business into industrial ecology by designing its products to reduce environmental impacts throughout the lifecycle.
- The final third of course introduces you to the practices companies have to develop to put design for the environment and industrial ecology into practice, for example: environmental reviews, environmental management systems, total cost accounting, green purchasing, green marketing, and reverse logistics.

### **EVALUATION SYSTEM**

The course is designed so that you can learn the most powerful way that a company can improve its environmental performance, that is by changing the design of its products. Thus most of the evaluation focuses on a project for designing a new product for a *real* company's product (see attached outline). The project can be done as a group or as an individual. A number of quizzes and exercises will be held in class to help you work through the concepts and to build up your project. A peer assessment will be conducted at the end of the course to ensure group cooperation and mutual effort.

- 20 % Quizzes, exercises, short presentations in class (approximately 6)
- 20 % Design for Environment proposal: devise a product that will significantly reduce the environmental impacts of a company throughout the product cycle; and adopt an industrial ecology to support it (annotated ppt of presentation to classmates).
- 15 % Presentation of your Design for Environment works and the corporate environmental programs supporting it. *Presentations are evaluated by classmates* (marks will be deducted for not attending and evaluating classmates).
- 35 % Final report: explanation of how your Design for Environment project can be integrated into the business strategy, environmental policy, and practices (10-20 pages depending on group size, individual contributions marked separately).
- 10 % Peer assessment
- 1-5 % Extra marks for participation (e.g. asking questions of instructor and fellow students).

### **ACADEMIC INTEGRITY**

You come to university to learn how to think and use information creatively. To do so you are exposed to and search out new ideas, theories, and practices. You learn how to use them to create your own ideas, to argue their importance, and see them put into action.

If you do so you will greatly enhance your career, enhance your relationships, live a more interesting life, drive a Ferrari etc.

Simply copying other people's work or ideas (usually called cheating), doesn't help you develop creativity. In this course you will work on how to extend other peoples ideas, learn how to use them for your own purposes and generate your own ideas. Cheating shouldn't be an issue. If it is, the University (therefore 'yours truly') must deal with you harshly (see: <http://www.ust.hk/vpaa/integrity/>).

## **INFORMATION SOURCES**

Most of what you need to know for this course is in "The Green to Gold Handbook" written by Esty and Simmons. It is a text on corporate environmental management and takes you from environmental problems to corporate strategy and is particularly strong on business functions. This book and an earlier version are accessible as e-books from the library. I will also be providing more depth on areas of environmental problems, sustainability, governance, lifecycle analysis, design for environment and particularly a company's challenge of ensuring that its DfE intention is realized in practice. For the later reason we discuss industrial ecology, and use Graedel and Allenby's books for that purpose. They are on reserve. A few books on DfE are also on reserve.

### **Corporate Environmental Management (Library Electronic Books)**

Esty, Daniel and P.J. Simmons 2011 *The Green to Gold Business Playbook*. Hoboken N.J.: Wiley

Esty, Daniel and Andrew Winston 2006 *Green to Gold*. Hoboken N.J.: Wiley

### **Industrial Ecology References On Reserve:**

Graedel T.E. and B.R. Allenby (2003). *Industrial Ecology 2<sup>nd</sup> Edition*. Upper Saddle River: Prentice Hall.

Allenby, Braden (1999). *Industrial Ecology: policy framework and implementation 1<sup>st</sup> Edition*. Upper Saddle River: Prentice Hall.

### **Design for Environment References on Reserve**

Fiskel, Joseph R. 2009 *Design for Environment*. New York: McGraw-Hill.

Natrass, Brian F and Mary Altomare 2002. *Dancing with the tiger : learning sustainability step by natural step*. Gabriola Island, B.C. : New Society Publishers.

McDonough, William and Michael Braungart 2002. *Cradle to cradle : remaking the way we make things*. New York : North Point Press.

Fussler, Claude 1996. *Driving eco-innovation : a breakthrough discipline for innovation and sustainability*. London : Pitman Publishing.

### **Useful Websites:**

<http://www.foe.org.hk/> (Friends of the Earth, Hong Kong)

<http://www.greenpeace.org> (greenpeace)

<http://www.rmi.org> (Rocky Mountain Institute)

<http://www.greenbiz.com/index.cfm> (Greenbiz.com)

<http://www.epd.gov.hk/> (Hong Kong's Environmental Protection Department)

<http://www.gdepb.gov.cn/eng/2002/em/> (Guangdong environmental protection)

department)

<http://www.epa.gov/> (The US Environmental Protection Agency)

<http://www.env.go.jp/en/> (Japan Ministry of the Environment [English])

<http://www.iisd.org/business/> (International Institute for Sustainable Development)

<http://www.gemi.org/> (GEMI Global Environmental Management Initiatives)

<http://www.wbcsd.ch/> (World Business Council on Sustainable Development)

<http://www.peopleandplanet.net> (population and environment issues)

Sustainable Development in the Yahoo! Directory

<http://www.ethicalcorp.com/> (information on corporate social responsibility)

<http://www.csrwire.com/> (information on corporate social responsibility)

<http://cgdm.berkeley.edu/> (Berkeley based consortium on green design)

<http://www.uneptie.org/pc/pc/tools/index.htm> (UN information on environmental management)

<http://www.climatebiz.com/> (Business resource for climate management)

<http://www.worldwatch.org/> (Environmental and resource information)

<http://www.cleanair-coolplanet.org/> (solutions to global warming)

<http://www.e2.org> (environmental entrepreneurs organization {US})

<http://cleantech.com/> (clean technology venture capital forum)

<http://www.wri.org> (world resources institute)

<http://www.bsdglobal.com> (business and sustainable development)

## Schedule

Time Period	Topic	Readings
Weeks 1-4	Sustainability and Strategy -Why and how corporations have to respond to demands for environmental sustainability	<i>Green to Gold Business Playbook</i> : Chapters 1-5, especially Ch. 5.
Weeks 5-8	Lifecycle analysis (LCA), Design for Environment (DfE), Industrial Ecology (IE) - How corporations can analyze the full impacts of their products, design the impacts out of them and ensure that their design will fit into real life situations.	<i>Green to Gold Business Playbook</i> : Chapters 6, 7 and 11. <i>Industrial Ecology 1<sup>st</sup> Edition?</i> : Chapters
Weeks 9-10	DfE presentations and submission - Explain to class how your design will reduce impacts through whole lifecycle; submit annotated ppt to instructor on soft copy.	

Weeks 11-13	Realizing design through corporate functions - Applying environmental management techniques used by different corporate functions to ensure DfE intent is realized.	<b>Group readings to integrate different functions</b> — <i>Green to Gold Business Playbook</i> : Chapters 17-21; especially chapters 17 (Accounting), 18, 20. <b>Individual readings for focus on specific functions</b> — <i>Green to Gold Business Playbook</i> : Chapters 8-16.
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## **SOSC 2170 ENVIRONMENT AND BUSINESS PROJECT OUTLINE**

Objective: learn the value of design and lifecycle thinking.

Means: choose a company and redesign one of its products to integrate into an industrial ecology.

People: the project can be done either as a group (max 5) or as an individual.

### **Stage I Design for Environment Presentation**

**Presentation in weeks 9-10; Annotated PPT on October 27, soft copied submitted to LMES.**

- 1) Define your product and explain relationship to corporate strategy
- 2) Propose a new design for a product and explain how the practices and technologies utilized will reduce impacts throughout the product cycle (with metrics)
- 3) Explain the interdependencies among the different stages of product cycle created by your DfE project.
- 4) Devise an industrial ecology that will enable your company to realize its DfE objectives through the use of physical and social infrastructures.
- 5) Explain the incentives for transactions to link each stage of the value cycle.

### **Stage II Final Project**

**Due Monday Dec. 1; 10-20 pages depending on group size; softcopy emailed to LMES.**

- 1) Explain how your DfE project fits into the environmental strategy and policy of company. You should include a review of how your DfE project reduces environmental impact throughout product cycle
- 2) Explain how your DfE project will be managed/implemented in the organization (allocation of responsibilities and lines of authority, explanation of interdependencies).
- 3) Explanation of how specific activities support the DfE project and explaining the interrelations among them (e.g. production, accounting, purchasing, marketing, logistics, public relations; minimum one activity per group member).
- 4) Explain how the different activities support the industrial ecology and value cycle.