Sungkyunkwan University (SKKU) International Summer Semester (ISS) 2017

"New Experience, New Engagement"

Technology, Society and Sustainability

Prof. Navrati Saxena, Sungkyunkwan University

SHORT COURSE DESCRIPTION

In this course we will learn about how the technology and society have changed and affected each other. In addition to that, we will discuss about how we develop and manage our technology and society to be sustainable. Traditionally, industries focus on smarter, faster and productive performance. This however, is not enough in evolving economies and performance metrics is dominated by sustainability in this new era of hyper connected environment. One major challenge in a sustainable business is that of reinvention. Collaboration between various sectors for innovations is proving to be a potent tool for acceleration towards sustainable future. Industrial Ecology (IE) is an interdisciplinary field that focuses on the sustainable collaboration between environment, economy and technology. The central idea is the analogy between natural and socio-technical systems. The word 'industrial' does not only refer to industrial complexes but more generally to how humans use natural resources in the production of goods and services. Ecology refers to the concept that our industrial systems should incorporate principles exhibited within natural ecosystems. Industrial ecology proposes not to see industrial systems (for example a factory, an ecoregion, or national or global economy) as being separate from the biosphere, but to consider it as a particular case of an ecosystem - but based on infrastructural capital rather than on natural capital. It is the idea that as natural systems do not have waste in them, we should model our systems after natural ones if we want them to be sustainable and bring prosperity in our surrounding environments.

READING MATERIALS

Reading materials will be provided in advance during the course. All the PowerPoint slides and other course material will be provided in the class. The following are general background readings:

	Title	Author	Year of Issue	ISBN
No. 1	Industrial Ecology: An Introduction	Andy Garner and Gregory A. Keoleian	1995	
	Title	Author	Year of Issue	ISBN
No. 2	Handbook of Input-Output Economics in Industrial Ecology	Suh Sang Won	2009	978-1-4020-4083-2 (Springer Publications)
	Title	Author	Year of Issue	ISBN
No. 3	Perspectives on Industrial Ecology	Dominique Bourg, Suren Erkman	2003	1874719462
	Title	Author	Year of Issue	ISBN
No. 4	Industrial Ecology	T. E. Graedel, Braden R. Allenby	2003	ISBN 0130467138, 9780130467133 (Publisher Prentice Hall)
	Title	Author	Year of Issue	ISBN
No. 5	Industrial Ecology and Global Change	Robert H. Socolow	1997	ISBN 0521577837, 9780521577830 (Publisher Cambridge University Press)

COURSE REQUIREMENTS AND GRADING

Attendance and active participation in class is very important for the completion of the course. Open discussions are encouraged and will be arranged on suitable topics. Academic Dishonesty, plagiarism, poor team work and less than 80% attendance (without prior information and professor's consent) leads a student to fail.

CRITERIA	ATTENDANCE	EXCURSION	CASE STUDY	PRESENTATION	DISCUSSIONS
WEIGHTAGE	10%	20%	30%	30%	10%
NOTE	< 80 % FAIL	Preparation, participation & presentation	Based on the topic Innovating through Collaboration/ Smart/Green Revolutions and projects around the world	Case study presentation	Active discussion & behavior

COURSE SCHEDULE

– WEEK I –

Tuesday (27 June)
Introduction
What is Industrial Ecology?
What is Sustainability and why do we need it?
How to attain sustainability – various tools

Wednesday (28 June)
Bio-Mimicry
Eco-Industrial Parks
Understanding how stuff works

Thursday (29 June)
Cosmetic Industry
Water & Ocean Sustainability

- Grey water Recycling
- Case Study on Technological Ecology in Singapore – NEWater
- Case Study Korea: ARISU
- Case Study China: Industrial Wastewater treatment in China

Friday (30 June)
Visit to Samsung Innovation Museum / any other interesting site

– WEEK II –

Monday (3 July)

Pollution Prevention

- Benefits and Extracting Principles
- Life Cycle Assessment

Green Art: Intro

- Global Sustainability Issues and concerns

Waste Management

Plastic Bottles and sustainability

Tuesday (4 July)

Sustainable Transport System

Automobile Industry:

- Smart and Green Cars
- Case Studies on Honda, Toyota and Hydrogen cars
- Principles of Disassembly
- Design for the Environment
- Design for Recycling

Bio Fuels

Team/Groups Division

- Preparation for next day's Excursion

Wednesday (5 July)

Sustainability Excursion:

- How much aware we are?
- Spreading Awareness

Thursday (6 July)

Groups' Discussion about the excursion

- Presentation on the excursion and experience

Green buildings and sustainable infrastructure

Eco City

Global warming

Deforestation

Friday (7 July)

Recycle Workshop

– WEEK III –

Monday (10 July)

Students' Case Study-I

- Innovating through Collaboration
- Smart/Green Revolutions and projects around the world

Tuesday (11 July)

Students' Case Study-II

- Innovating through Collaboration
- Smart/Green Revolutions and projects around the world

Wednesday (12 July)

Students Presentations – I

Thursday (13 July)
Students Presentations – II

Friday (14 July)
Various Smart and Green Revolutions and projects around the world
Case Studies

- Automobile Industry
- Electronics Industry
- E-commerce
- Service Industry
- Fashion Industry
- Summing up the students' case studies

– WEEK IV –

Monday (17 July)
Final Remarks/discussions and Wrap-up

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
JUNE		(1) **27** Introduction Industrial Ecology? Why Sustainability? Sustainability Tools	(2) **28** Bio-Mimicry Eco-Industrial Parks Understanding how stuff works	(3) **29** Cosmetic Industry Water/Ocean Sustainability Grey water Recycling NEWater ARISU China	(4) **30** Visit to Samsung Innovation Museum / any other interesting site
JULY	(5) **03** Pollution Prevention Life Cycle Assessment Green Art: Intro Global Sustainability Issues and concerns Waste Management Plastic Bottles and sustainability	(6) **04** Sustainable Transport System Automobile Industry Bio Fuels Team/Groups Division	(7) **05** Sustainability Excursion: How much aware we are? Spreading Awareness	(8) **06** Groups' Discussion about the excursion Green buildings & Sustainable Infrastructure Eco City Global warming Deforestation	(9) **07** Recycle Workshop
JULY	(10) **10** Students' Case Study-I	(11) **11** Students' Case Study-II	(12) **12** Students Presentations–I	(13) **13** Students Presentations–II	(14) **14** Various Smart and Green Revolutions and projects around the world Case Studies wrap up
JULY	(15) **17** Final Remarks Wrap-Up				