Sungkyunkwan University (SKKU) International Summer Semester (ISS) 2022

Technology, Society, and Sustainability

SHORT COURSE DESCRIPTION

Traditionally, industries have pursued smarter, faster, cheaper, and more productive performance rather than sustainability. 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 systems and socio-technical systems. The word 'industrial' does not only refer to industrial complexes, but also more generally imply how humans use natural resources in the design and 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 eco-region, or national/global economy) as being separated from the biosphere, but to consider it as part of an ecosystem based on infrastructural capital rather than on natural capital. As natural systems do not have waste in them, we should model industrial systems after natural ones to make them sustainable and to bring prosperity in our surrounding environments. This course will first discuss about how the technology and society have changed and affected each other. Then, according to the lightning speed of technological evolution, we will learn how we could run our technology and society in consideration of sustainability, that is, heading towards sustainable future via close collaborations between business sectors, OEMs, and suppliers.

READING MATERIALS

Reading materials will be provided in advance during the course. All the lecture notes and other course materials will be provided in the class. Background readings include:

1. Industrial Ecology: An Introduction, Andy Garner and Gregory A. Keoleian (1995).
2. Sustainability Primer version 9, EPA (2022).
3. GSA Sustainable Facilities Tool – explore "Learn", "Plan", "Explore", "Procure" submenus, *sftool.gov (2022).*
4. *Technology and Society – Impact of technology on society,* Karehka Ramey (2012).
5. Types of Impacts of Technology, United Nations Environment Programme, Division of Technology, Industry, and Economics http://www.unep.or.jp/ietc/Publications/Integrative/EnTA/AEET/6.asp (2018).

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 notice and professor's consent) leads a student to fail.

CRITERIA	ATTENDANCE	EXCURSION	CASE STUDY	PRESENTATION	GROUP WORK	PARTICIPATION
WEIGHT	10%	15%	30%	20%	15%	10%
NOTE	< 80 % FAIL	Preparation, participation & presentation	Based on the topic Innovating smart and green collaborations and revolutions around the world	Case study and other presentations	Group assignments	Active discussion & behavior

COURSE SCHEDULE

– WEEK I –

Monday (27 June)
Introduction
Impact of technology on society
Types of impacts of technology
What is Industrial Ecology?
What is Sustainability?

Tuesday (28 June)
Why do we need Sustainability?
How to attain Sustainability?

Wednesday (29 June)
What is Sustainable Manufacturing?
Technology roles for Product Life Cycle Management

Thursday (30 June)
Technology spectrum – where are we in the state of the art?
Bio-Mimicry

– WEEK II –

Monday (4 July)
Eco-Industrial Parks
Understanding how stuff work
Sustainability documentaries

Tuesday (5 July)
Sustainability calculator exercise
Sustainable Transport System - Automobile Industry:
- Smart and Green Cars
- Case Studies on Honda, Toyota and Hydrogen cars

Wednesday (6 July)
Design for the Environment
EPA navigation and investigation

Thursday (7 July)
Design for Recycling
Bio Fuels
Role play

– WEEK III –

Monday (11 July)
Eco City
Case study on five cities going green: Ulsan, Korea
Case study on smart cities: Pangyo, Korea
Case study on green transport in Korea
Case study on water resource management in Korea
Case study on Eco-Industrial Park in Korea
Groups Division
- Preparation for next day's Excursion

Tuesday (12 July)
Sustainability Excursion:
- How much aware we are?

- Spreading Awareness

Wednesday (13 July)
Green buildings and sustainable infrastructure –
Pollution Prevention
- Pollution prevention approaches
- Measuring pollution prevention
- Pollution prevention tools and calculators

Waste Management
Plastic Bottles and sustainability

Thursday (14 July)
Global warming
Deforestation
Recycling Workshop

Friday (15 July)
Various Smart and Green Revolutions and projects around the world
- Service Industry
- E-commerce
- Electronics Industry
- Fashion Industry
- Automobile Industry

– WEEK IV–

Monday (18 July)
Continue for Smart and Green Revolutions and projects
Students Presentations – I

Tuesday (19 July)
Students Presentations – II
Final Remarks/discussions and Wrap-up