

Syllabus

Sustainability, life cycle thinking and Industrial Ecology

Summer Course at University of Technology of Troyes, France (51 hours, 6 ECTS credits)
Instructor: Dr. Bertrand LARATTE and Dr. Junbeum KIM

Course objective and description

Sustainability is one of the biggest principles which consider economic, human and environmental aspects in future development. The students successfully completing this course will have a solid understanding of the emerging discipline of sustainability, life cycle thinking and industrial ecology. The students will also be able to solve several types of problems linked to estimating the human impact on global systems as well as how to reduce this impact. Finally, the students will be able to contribute ideas toward solutions to some of our society's most pressing environmental problems by applying the principles of sustainability, a focus on environmental areas with the notion of life cycle thinking, and the principles and methods of industrial ecology.

Course structure and outline

1) Sustainability (5 hours)

- Introduction to Sustainability.
- Sustainability or Collapsing?
- The Anthropocene.

References:

The class will use very different materials, from journal articles to short videos. Among scientific sources are the following documents:

World Commission on Environment & Development, Our Common Future, Oxford University Press 1987.

Paul Crutzen, A Geology of Mankind, Nature, Nature 415, 23 (3 January 2002).

Steffen, W., et al., Global Change and the Earth System: A Planet Under Pressure, The IGBP Series, Springer, 2004.

Diamond, J. Collapse: How Societies Choose to Fail or Succeed, Viking Press, 2005.

Homework:

2 assignments (1 reading assignment; a 1-page scenario writing)

Exam:

1 quizz

2) Life Cycle Thinking (23 hours)

- Eco-design
- Environmental Impact Assessment
- Life Cycle Assessment
- Environmental Communication

References:

There is no textbook for this part. The class will use summaries of journal articles as well as summaries of books and manuals. Some of the books from which material has been taken include the following:

- Product design and environment: 90 examples of eco-design, French Agency for environment and energy management
- Design for sustainability: a sourcebook of integrated eco-logical solutions, Birkeland, Janis
- Life cycle design: a manual for small and medium-sized enterprises, Berlin New York : Springer

Homework:

1 report on a simplified environmental assessment of a product (10 pages maximum)

Exam:

1 oral presentation (15 to 20 minutes)

3) Industrial Ecology (23 hours)

- Symbiosis
- Resource management
- Material and Waste Flow Analysis

References:

There is no textbook for this part. However, the class will use summaries of journal articles as well as summaries of books provided by the instructor. Some of the books from which material has been taken include the following:

- Industrial Ecology (2ND Edition), T.E. Graedel and Braden Allenby, Prentice Hall; 2 edition
- Industrial Ecology and Sustainable Engineering, T.E. Graedel and Braden Allenby, Prentice Hall; 1 edition
- Practical Handbook of Material Flow Analysis (Advanced Methods in Resource and Waste Management Series, Paul H. Brunner and Helmut Rechberger, CRC Press

Homework:

1 assignment consisting of a 2-page summary of a related journal paper (Journal of Industrial Ecology, International Journal of Life Cycle Assessment etc.)

Exam:

1 exam on industrial ecology and material flow analysis

Assessment

Class Participation 20%

Homework 40%

Final Exam 40%