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2873—Industrial Ecology & Eco-Industrial Development

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Friday 09:10-12:00 in M108

Syllabus

Credit: 3 hours

Course Summary

This semester, we will review various aspects of the field of industrial ecology with some emphasis on ecology and sustainability. You will also conduct a life cycle assessment on a product of your choice.

Tentative schedule:

Week	Lecture Topic	Assigned Reading	Deadlines
3/6	Introduction: Humans & Technology	[1] Chapter 1	
3/13	Life cycle assessment I	[1] Chapter 12	
3/20	Dr. Hsu & 呂政: Precision method of aquaculture (Possibly in room A106, not confirmed)		
3/27	Life cycle assessment II	[1] Chapters 13 & 14	Last date to select summary week Last date to select product
4/3	Holiday		
4/10	Concepts of Sustainability	[1] Chapters 2 & 3	
4/17	Relevance of Biology & Metabolism	[1] Chapters 4 & 5	Proposal Presentations
4/24	Technology, risk, and social dimensions	[1] Chapters 6 & 7	
5/1	**Midterm Exam**		
5/8	Sustainable Engineering and Product Development	[1] Chapters 8 & 9	
5/15	Design for Sustainability	[1] Chapters 10 & 11	
5/22	Systems Analysis	[1] Chapters 15 &16	
5/29	National & Urban Accounting	[1] Chapters 18 & 21	
6/5	**Final Presentations**		Final Presentations
6/12	Modeling & Scenarios	[1] Chapters 22 & 23	
6/19	Resources, Government, & Future	[1] Chapters 24, 27-28	Last date for Final Paper
6/26	Holiday		
7/3	**Final Exam**		

Course Policy

1) In advance (a minimum of 3 days before the due date; earlier is always better!), tell me of problems meeting deadlines and assignments. Assignments lose 20% for each week late.
2) Do your own work. Do not copy! Do not use computer translations. You must paraphrase. Avoid quotes.
3) You must cite your sources (use citations). In essays and written reports, each citation must correspond to a reference in the Literature Cited.
4) For all writing assignments and presentations, citations and references must be in the style of the journal Sustainability[2].
5) **Copying of anything anywhere is penalized by failure of the assignment (maximum possible grade=48%)**. Anything copied from classmates includes failure of your and their assignments. See policies 6 & 7 for possible exceptions.
6) Presentations (PPT) may use images from the internet, but you must provide exact links with the image or supply a citation and page number (for images from books). Each fact, quote, or idea must have a citation with it on the slide. Complete reference for each citation must be in the notes section of each slide (see policy 4).
7) **Images may not be included in any written report unless you have written permission from the copyright holder.** This includes almost any image from any website (although see creative commons licensing and publications by USA governmental employees). If you are not sure the image is OK, confirm with me before assignment due date. Each acceptable image must include a citation in the figure legend and an explanation of acceptability and a reference in Literature Cited.
8) **Academic fraud (including faking data and not admitting errors) is penalized by failure of the group project (maximum possible grade=48%).**

Life cycle assessment

In small groups, you will select a product for a cradle-to-cradle life cycle assessment. You will present your proposed product to the class (3 minutes: title, hypothesis or objectives, methods). After completing your assessment, you will present your results to the class (8 minutes: title, product, source, production, packaging, transportation, use, disposal, reuse in a circular economy, and conclusion). You will write up your assessment as a manuscript to be submitted to the journal, Sustainability [2]. Your paper should have these sections: title, introduction (includes literature review, goal, and scope), life cycle inventory (with subheadings for each stage), life cycle impact assessment, discussion, conclusion, author contributions, acknowledgments, conflict of interest, literature cited, tables (if needed), and figures (if needed).

Discussion

In pairs, you will prepare questions from the reading assignment to be answered by classmates, answer questions prepared by classmates, and evaluate classmates' questions and answers. In a large group, you will discuss the reading.

Summary Week

In small groups of 2-3, you will prepare a 10-15 minute PPT (about 5 minutes per chapter) summarizing the readings for one week.

Required Texts

1. Graedel, T. E., Allenby, B. R. Industrial Ecology and Sustainable Engineering. International Edition. Pearson Education, Inc., Upper Saddle River, New Jersey, USA. 2015.
2. Instructions to Authors. Sustainability. Available online: https://www.mdpi.com/journal/sustainability/instructions (accessed on 29 December 2019).

Grading: Grades are based on 1) Proposal presentations (5%), 2) Final presentations (10%), 3) Final paper (30%), 4) Discussion and attendance (15%), 5) Chapter summary (10%), 5) Midterm exam (10%), and 6) Final exam (20%).

Life cycle assessment
In small groups, you will select a product for a cradle-to-cradle life cycle assessment. You will present proposal and final report . You will write your assessment following guidelines for the journal, Sustainability.

Discussion
In pairs, you will prepare questions from the reading assignment to be answered by classmates, answer questions prepared by classmates, and evaluate classmates' questions and answers. In a large group, you will discuss the reading.

Summary Week
In small groups, you will prepare a 10-15 minute PPT summarizing the readings for one week.

1) In advance, tell me of problems meeting deadlines and assignments.
2) Assignments lose 20% for each week late.
3) Do your own work. Do not use computer translations
4) Cite your sources.
5) Use Journal of Wildlife Management style for citations and references.
6) Put exact links with images used in PPT.
7) Include written permission from copyright holder with images used in written assignments.
8) Copying and academic fraud means assignment maximum possible score is 48%.