2016-10
ADMI 1190-1

FUNDAMENTALS OF ECOSYSTEM SERVICES: UNDERSTANDING HUMAN-NATURE INTERACTIONS

Mondays & Wednesdays 10:00 – 11:20
[Classroom]

Instructor
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COURSE DESCRIPTION

Human cannot sustain without Mother Nature. Our living relies on using services and products provided by natural ecosystems. However, such relationship has been largely missing in the discourse of modern economic development. We achieved significant material wealth, but this comes at unprecedented costs such as scarcity of resources, degradation of forest and land, and deterioration of water and air. Facing environmental problems and crisis, we need to explore alternative paths for sustainable development.

The objective of this course is to provide students with basic understanding of human-nature interactions based on the concept of ecosystem services. The course will first focus on understanding human system as well as natural ecosystem, regarding its structure and function, and then move onto examining interactions between the two, particularly regarding how modern industrial production and consumption has altered natural ecosystems. With this understanding, students are expected to develop capability to analyze conflicts and dilemmas around global and local environmental issues. This is the fundamental course required for all incoming students at the School of Management and is prerequisite for advanced courses such as environmental management and social responsibility. The working language for this course is English.

The key questions that the course will examine include:

- How are human and natural systems structured and what are their functions?
- What interactions exist between human and natural systems? What services do natural ecosystems provide to humans and how human production and consumption activities have relied on and influenced those services?
- What are the implications of human-nature interactions on environmental decision-making?

RELATION TO THE LEARNING OBJECTIVE OF THE UNDERGRADUATE PROGRAM

This course will contribute to achieve two of the undergraduate program objectives:

1. To become a fully responsible professional who contributes to sustainable development of organizations
2. To develop a critical perspective on local, national, and international environment of the organizations

COURSE OBJECTIVES

To understand the value of ecosystem services and the implications of human activities on natural ecosystems

3. To understand how human and natural systems are structured and function
4. To examine interactions between humans and natural ecosystems, regarding how humans has relied on and altered ecosystem and its services
5. To explore approaches to address human impacts on ecosystems and understand complexities involved in environmental management decision-making

METHOD

Participation and quizzes (individual)

To promote active learning, this course will require active participation of students in various forms such as presentations, panel discussions and class debates. All types of participation will be tracked throughout the semester and reflected in the final grades. As a complementary way to evaluate participation, unnoticed quizzes may be taken at the beginning or end of a lecture.

Exam (individual)

There will be one in-class written exam after the second module of the course to evaluate learning throughout the first and second module.

Case study (group)

The second module of the course will involve detailed case studies to examine human impacts on a certain aspect of ecosystem. For each type of human impacts on ecosystem, instructor will first provide a general overview and in the following week, a group of students (2-4 students) will present their case study. The detailed instructions about the case study will be available through Sicuaplus at the early of the semester.

Panel discussions and debates (group)

The third module of the course will include in-class panel discussions that can simulate a decision-making process for a specific environmental issue. For each discussion, there

will be three main stakeholders: industry, government, and community/NGO. A group of students (2-3 students) will represent one stakeholder and defend its position and interests (10-min presentation). After the panel presentations, the entire class will ask questions, pose critiques, and have discussions about the subject and the final lessons will be derived.

Reports (group)
Students will need to submit two reports that will help them train and hone their academic writing skills: one along with case study and the other related to the panel discussions. Detailed instructions on the format of writing will be provided through Sicuaplus.

Class projects (group)
For class project, a group of students (3-4 students) will make a short film (10-20 min) that examines human-nature interactions in Colombia. The topic and format for the film is free of choice. For example, the film can be about mining activities in Colombia, showing how it destroys the surrounding ecosystems, how a mining company is attempting to minimize the impact through its sustainability initiatives, or how local communities perceive its activities. It can include the scene of the nature, interviews, or animations. Final product will be presented at the end of the class sessions and will be evaluated by your peer students, TAs and the instructor.

EVALUATION MECHANISMS

Element	%	Evaluator	Criteria	Relation to the learning objectives
Participation and quizzes (individual)	20%	TAs and instructor	• Class attendance • The frequency of participation in class discussions • Understanding of the class materials (e.g., lecture, student presentations, discussions)	-
Exam (individual)	25%	TAs and Instructor	• Understanding of the concept • Numeric correctness • Argumentation	1, 2
Case study presentations (group)	10%	TAs and instructor	• Use of quantitative data and supporting information • Breath and depth of analysis • Clarity and effectiveness of the presentation (including time	1, 2

			management)	
Panel discussions and debates (group)	10%	TAs and instructor	• Use of quantitative data and supporting information • Clarity and effectiveness of the argumentation	1, 2, 3
Reports (group)	15%	TAs and instructor	• Use of quantitative data and supporting information • Breath and depth of analysis • Writing styles (e.g., grammar, flow, referencing)	1, 2, 3
Class projects (group)	20%	Peer students, TAs, and instructor	• Relevance to course topics • Use of supporting information • Presentation styles	1, 2, 3

PROGRAM

Class #	Date	Class Title
1	January 18	Introduction
Fundamentals of Human and Natural Systems		
2	January 20	Human production and consumption systems
3	January 25	Mining and resource
4	January 27	Agriculture and food
5	February 1	Manufacturing and service
6	February 3	Natural system: ecosystem structure and function
7	February 8	Ecosystem services
8	February 10	Ecosystems and human well-being
Human Impacts on Nature: States of Ecosystem Services		
9	February 15	Human impacts on water
10	February 17	Case study presentation I
11	February 22	Human impacts on nutrient cycle
12	February 24	Case study presentation II
13	February 29	Human impacts on climate
14	March 2	Case study presentation III
15	March 7	Human impacts on land and biodiversity
16	March 9	Case study presentation IV
17	March 14	Planetary boundaries and global environmental change
18	March 16	Exam

Managing Human-Nature Systems		
19	March 28	Management decision-making for sustainable development
20	March 30	Mining
21	April 4	Student debate: mining in Colombia
22	April 6	Energy industry
23	April 11	Student debate: hydropower development in Colombia
24	April 13	Urban sustainability
25	April 18	Student debate: transportation options in Bogota
26	April 20	Waste management
27	April 25	Student debate: waste management in Bogota
28	April 27	Class project presentations I
29	May 2	Class project presentations II
30	May 4	Wrap-up

DETAILED PROGRAM

Class 1. January 18 Monday

Introduction

- Introduce the course objective, structure and plan
- Share background and interests of students

Class 2. January 20 Wednesday

Human production and consumption systems

- Examine implications of the modern production and consumption systems on the natural environment
- Exercise: tracking production chains and processes for a product

Materials

- UNEP. 2012. Global Environmental Outlook 5. Chapter 1: Drivers. (Online link: http://www.unep.org/geo/geo5.asp)

Class 3. January 25 Monday

Mining and resource

- Examine resource consumption of the modern human systems
- Understand mining practices

Class 4. January 27 Wednesday

Agriculture and food

- Examine patterns of food consumption
- Understand agriculture and food production systems

Class 5. February 1 Monday

Manufacturing and service

- Examine manufacturing and service systems
- Explore different examples of manufacturing processes and discuss potential environmental impacts

Class 6. February 3 Wednesday

Natural systems: ecosystem structure and function

- Physical environment, biome, climate
- Temporal and spatial dynamics

Materials

- Ricklefs, R.E. 2008. The Economy of Nature. Chapter 2, 3, 4, and 5

Class 7. February 8 Monday

Ecosystem services

- Understand the concept and classification of ecosystem services

Materials

- Millennium Ecosystem Assessment. 2005. Chapter 2. Ecosystems and Their Services. In *Ecosystems and Human Well-being: A Framework for Assessment* (online: http://www.unep.org/maweb/documents/document.300.aspx.pdf)
- Millennium Ecosystem Assessment. 2005. Chapter 6. Concepts of Ecosystem Value and Valuation Approaches. In *Ecosystems and Human Well-being: A Framework for Assessment* (online: http://www.millenniumassessment.org/documents/document.304.aspx.pdf)

Class 8. February 10 Wednesday

Ecosystems and human wellbeing

- Examine intersections between natural ecosystems and human activities and wellbeing

Materials

- Millennium Ecosystem Assessment. 2005. Chapter 3. Ecosystems and Human Well-being. In *Ecosystems and Human Well-being: A Framework for Assessment* (online: http://www.millenniumassessment.org/documents/document.301.aspx.pdf)
- Hanson, C., J. Ranganathan, C. Iceland, and J. Finisdore. 2012. The Corporate Ecosystem Services Review: Guidelines for Identifying Business Risks and Opportunities Arising from Ecosystem Change. Version 2.0. Washington, DC: World Resources Institute.

Class 9. February 15 Monday

Human impacts on water

Materials

- UNEP. 2012. Global Environmental Outlook 5. Chapter 4: Water. (Online link: http://www.unep.org/geo/geo5.asp)

Class 10. February 17 Wednesday

Case study presentation I

- Student presentations on the state and trends of water in Colombia

Class 11. February 22 Monday

Human impacts on nutrient cycle

Materials

- Millennium Ecosystem Assessment, 2005. Nutrient Cycling. In *Ecosystems and Human Well-being: Current State and Trends*. Hassan, R., Scholes, R., and Ash, N. eds. Island Press, Washington DC, p. 331-354.

Class 12. February 24 Wednesday

Case study presentation II

- Student presentations on the state and trends of nutrient cycle

Class 13. February 29 Monday

Human impacts on climate

Materials

- UNEP. 2012. Global Environmental Outlook 5. Chapter 2: Atmosphere. (Online link: http://www.unep.org/geo/geo5.asp)
- IPCC, 2013. Summary for Policymakers. In *Climate Change 2013: The Physical Science Basis*. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Class 14. March 2 Wednesday

Case study presentation III

- Student presentations on the state and trends of climate change impacts in Colombia

Class 15. March 7 Monday

Human impacts on land and biodiversity

Materials

- UNEP. 2012. Global Environmental Outlook 5. Chapter 3: Land. (Online link: http://www.unep.org/geo/geo5.asp)
- UNEP. 2012. Global Environmental Outlook 5. Chapter 5: Biodiversity. (Online link: http://www.unep.org/geo/geo5.asp)

- Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-being: Biodiversity Synthesis*. World Resources Institute, Washington, DC., Summary for Decision-makers (supplementary)

Class 16. March 9 Wednesday

Case study presentation IV

- Student presentations on the state and trends of land and biodiversity issues in Colombia

Materials

- Ministry of Environment and Sustainable Development. National policy for the integral management of biodiversity and its ecosystemic services, Republic of Colombia. (Online link: http://www.portalces.org/biblioteca/distribucion-equitativa-de-costos-beneficios/national-policy-integral-management)

Class 17. March 14 Monday

Planetary boundaries and global environmental change

- Introduce different ways to measure environmental performance at national and global level
- Understand global ecosystem response and the concept of planetary boundaries

Materials

- Johan Rockstrom: Let the environment guide our development https://www.youtube.com/watch?v=RgqtrlixYR4 (~20 minutes)
- Rockstrom et al. 2011. A safe operating space for humanity. Nature 461: 472-475. (link: http://www.nature.com/nature/journal/v461/n7263/full/461472a.html)

Class 18. March 16 Wednesday

Exam

Class 19. March 28 Monday

Management decision-making for sustainable development

- Introduce panel discussion activity
- Discuss decision-making for sustainable development

Materials

- Sustainable development goals: https://sustainabledevelopment.un.org/sdgsproposal
- UN Sustainable Development Solutions Network. An Action Agenda for Sustainable Development. http://unsdsn.org/files/2013/11/An-Action-Agenda-for-Sustainable-Development.pdf

Class 20. March 30 Wednesday

Mining

- Discuss environmental and social issues involved with mining activities in Latin America

Materials

- PBI Colombia. 2011. Mining in Colombia: at what cost? Newsletter 18
- Sarmiento, M., Giraldo, B. H., Ayala, H., Uran, A., Soto, A.C. and Martinez, L. 2013. Chapter 4. Characteristic and challenges of small-scale gold mining in Colombia. In Small-Scale Gold Mining in the Amazon: The Cases of Bolivia, Brazil, Colombia, Peru, and Suriname, Cremers, L., Kolen, J., and De Theije, M. eds. The Netherlands.

Class 21. April 4 Monday

Student debate: mining in Colombia (tentative)

Class 22. April 6 Wednesday

Energy industry

- Discuss environmental and social issues involved with energy industry (fossil fuel and renewable energy)

Class 23. April 11 Monday

Student debate: hydroelectric power development in Colombia (tentative)

Class 24. April 13 Wednesday

Urban sustainability

- Discuss sustainability issues in urban settings

Materials

- Mejia-Dugand, S., Hjelm, O., Bass, L, and Rios, R.A. 2013. Lessons from the spread of Bus Rapid Transit in Latin America. Journal of Cleaner Production 50: 82-90.

Class 25. April 18 Monday

Student debate: transportation options in Bogota (tentative)

Class 26. April 20 Wednesday

Waste management

- Discuss environmental and social issues involved with waste management

Materials

- UNEP. 2015. Global Waste Management Outlook
- OECD/ECLAC, 2014. OECD Environmental Performance Reviews: Colombia 2014, OECD Publishing. Chapter 5. Waste

Class 27. April 25 Monday

Student debate: waste management in Bogota (tentative)

Class 28. April 27 Wednesday

Class project presentations I

- Student final project presentations and peer review

Class 29. May 2 Monday

Class project presentations II

- Student final project presentations and peer review

Class 30. May 4 Wednesday

Wrap-up

HOUSE RULES

- Use of electronic devices: The use of cellphones, laptops, or other electronic devices during the class is prohibited unless noted.
- Punctuality: Classes start at a scheduled time. No entrance is allowed after ten minutes.
- Claims: Any claims should be made in five business days from the day when the evaluations are noticed. Claims should be made in written forms, preferably in emails to a teaching assistant or an instructor.
- Plagiarism, copyright, academic integrity: Plagiarism and other violations of academic integrity are strictly prohibited and subject to penalty as defined by the University. Information about the academic requirements can be found at: [http://secretariageneral.uniandes.edu.co/images/documents/Reglamento_Gral_Estudiantes_Pregrado_año_2013.pdf]. All writings should be original, but if the ideas are from other sources, you should cite them using footnotes or other citation methods. The guidelines for citation can be found at: [http://decanaturadeestudiantes.uniandes.edu.co/Documentos/cartilla_de_citas.pdf].