

Annexe A: New/Revised Course Content in OBTL+ Format

Course Overview

Expected Implementation in Academic Year (New format)	AY2024-2025
Semester/Trimester/Others (specify approx. Start/End date)	Semester 2
Course Author * Faculty proposing/revising the course	Asst Prof Lee Ser Huay Janice
Course Author Email	janicelee@ntu.edu.sg
Course Title	COUPLED HUMAN & NATURAL SYSTEMS
Course Code	ES3201
Academic Units	3
Contact Hours	39
Research Experience Components	Not Applicable

Course Requisites (if applicable)

Pre-requisites	ES1001: Environment and Society
Co-requisites	ES2203: Global Environmental Politics and Governance
Pre-requisite to	Nil
Mutually exclusive to	Nil
Replacement course to	Nil
Remarks (if any)	Nil

Course Aims

The course will introduce the study of coupled human and natural systems drawing primarily from land systems science research, which is the study of past, current, and projected state and dynamics of land use.

The course will focus on identifying social and ecological components and processes in coupled human and natural systems (used interchangeably with socioecological systems) and apply established frameworks to the study of connections and linkages across social and ecological realms.

The aims of this course are to apply established socioecological frameworks, develop a working knowledge of social science research methods and spatial analyses when studying coupled human and natural systems.

Graduate students interested to make their research more applied and policy-relevant can consider taking this course.

Course's Intended Learning Outcomes (ILOs)

Upon the successful completion of this course, you (student) would be able to:

ILO 1	Describe major concepts in the study of coupled human and natural systems.
ILO 2	Apply established conceptual frameworks to study human-environment interactions.
ILO 3	Design appropriate social surveys for the collection of social data.
ILO 4	Generate meaningful maps and interpretation of spatial analysis results.
ILO 5	Communicate concepts in coupled human and natural systems effectively in written and spoken word.
ILO 6	Discuss the role of social sciences in the study of earth and environmental systems sciences.
ILO 7	Develop creative and critical thinking skills.
ILO 8	Develop skills in reviewing their peers' written work and provide constructive feedback.

Course Content

Land Use and Land Cover Change, Land Systems Science, Telecoupling, Socioecological Systems

Reading and References (if applicable)

Textbooks:

1. Environmental Social Science: Human-Environment Interactions and Sustainability by Moran, E. [LWNL Call No. GF75.M829e; e-book access through NTU Library]
2. Navigating Social-Ecological Systems: Building Resilience for Complexity and Change by Berkes, F., Colding, J., Folke, C. [e-book access through NTU Library]
3. The Princeton Guide to Ecology by Levin S. [e-book access through NTU Library]
4. Conducting research in conservation: social science methods and practice by Helen Newig (and others) [LWNL Call No. GE10.C746]
5. Web resources: Human Ecology-Basic Concepts for Sustainable Development by Gerald Marten
(<http://www.gerrymarten.com/human-ecology/tableofcontents.html>)

Readings:

Week	Readings/Online resources
1 – Introduction to CHNS	<u>Readings (*required, #optional):</u> * Liu et al. (2021) Coupled human and natural systems: The evolution and applications of an integrated framework. <i>Ambio</i> # Liu et al. (2007) Coupled Human and Natural Systems. <i>Ambio</i> #Alberti et al. (2011) Research on Coupled Human and Natural Systems (CHANS): Approach, Challenges, and Strategies. <i>Bulletin of the Ecological Society of America</i> #Turner II & Robbins (2008) Land-Change Science and Political Ecology: Similarities, Differences, and Implications for Sustainability Science. <i>Annu. Rev. Environ. Resour.</i> #Lave et al. (2014) Intervention: Critical physical geography. <i>The Canadian Geographer</i>
2 – Systems Perspectives	<u>Readings (*required, #optional):</u> *InsightMaker – Types of Modeling: https://insightmaker.com/Modeling
3 – Discussion	*Tragedy of the tragedy of the Commons: https://blogs.scientificamerican.com/voices/the-tragedy-of-the-tragedy-of-the-commons/
4 – Frameworks for studying CHNS	<u>Readings (*required, #optional):</u> *Binder et al. (2013) Comparison of Frameworks for Analyzing Social-Ecological Systems. <i>Ecology & Society</i> #Imenda (2014) Is there a conceptual difference between theoretical and conceptual frameworks? <i>Journal of Social Sciences</i> #Cumming (2014) Theoretical frameworks for the analysis of social-ecological systems #Anderies et al. (2022) A framework for conceptualizing and modeling social-ecological systems for conservation research. <i>Biological Conservation</i>.

5 – Social systems I	<u>Readings (*required, #optional):</u> *Moon & Blackman. (2014) A Guide to Understanding Social Science Research for Natural Scientists. Conservation Biology *Martin (2019) Four Common Problems in Environmental Social Research Undertaken by Natural Scientists. Bioscience #Ostrom & Nagendra (2006) Insights on linking forests, trees, and people from the air, on the ground, and in the laboratory. PNAS #Telecoupling: A New Framework for Researching Land-Use Change in a Globalised World (2019) by Cecilie Friis.
6 – Social systems II	<u>Readings (*required, #optional):</u> #Neuman (2006) Social Research Methods: Qualitative and Quantitative Approaches, 6th Edition #Dillman et al. (2014) Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method, 4th Ed
7 – Questionnaire development	<u>Readings (*required, #optional):</u> #Neuman (2006) Social Research Methods: Qualitative and Quantitative Approaches, 6th Edition #Dillman et al. (2014) Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method, 4th Ed
Recess week – Overseas field trip	*Palm to Plate https://chinadialogue.net/en/food/from-palm-to-plate-tracing-sustainable-palm-oil-along-the-supply-chain/
8 – Land systems I	<u>Readings (*required, #optional):</u> *Lambin et al. (2001) The cause of land-use and land-cover change: moving beyond the myths. <i>Global Environmental Change</i> *Geist & Lambin (2002) Proximate causes and underlying driving forces of tropical deforestation. <i>Bioscience</i> *Ng & Sovacool (2012) Of fast lanes, flora and foreign workers: Managing land use conflicts in Singapore. <i>Land Use Policy</i> #Verburg et al. (2015) Land system science and sustainable development of the earth system: A global land project
9 – Land systems II	NIL
10 – Mapping the environment	NIL
11 – A Telecoupled World	<u>Readings (*required, #optional):</u> * Liu et al. (2013) Framing Sustainability in a Telecoupled World. Ecology & Society *Nystrom et al. (2019) Anatomy and resilience of the global production ecosystem. Nature #Telecoupling: A New Framework for Researching Land-Use Change in a Globalised World (2019) by Cecilie Friis.

	#Resource Trade: https://resourcetrade.earth/
12 – Course overview	NIL
13 – Oral exams	NIL

Planned Schedule

Week or Session	Topics or Themes	ILO	Delivery Mode	Activities	Readings
1	Introduction to CHNS	1, 2	In-person	In-class discussions	*Liu et al. (2007) Coupled Human and Natural Systems. Ambio
2	Systems Perspectives	1,2, 5	In-person	In-class discussions, InsighMaker activity	*InsightMaker – Types of Modeling: https://insightmaker.com/Modeling
3	Discussion	1,2	Online	Online discussion	*Tragedy of the tragedy of the Commons: https://blogs.scientificamerican.com/voices/the-tragedy-of-the-tragedy-of-the-commons/
4	Frameworks for studying CHNS	2,5,7	In-person	In-class discussions	*Binder et al. (2013) Comparison of Frameworks for Analyzing Social-Ecological Systems. Ecology & Society
5	Social systems I	1,3,5,6,7,8	In-person	In-class discussions	*Moon & Blackman. (2014) A Guide to Understanding Social Science Research for Natural Scientists. Conservation Biology *Martin (2019) Four Common Problems in Environmental Social Research Undertaken by Natural Scientists. Bioscience
6	Social systems II	1,3,5,6,7,8	In-person	In-class discussions	#Neuman (2006) Social Research Methods: Qualitative and Quantitative Approaches, 6th Edition #Dillman et al. (2014) Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method, 4th Ed
7	Questionnaire development	1,3,5,6,7,8	In-person	In-class discussions	#Neuman (2006) Social Research Methods: Qualitative and Quantitative Approaches, 6th Edition #Dillman et al. (2014) Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method, 4th Ed

Week or Session	Topics or Themes	ILO	Delivery Mode	Activities	Readings
8	Land systems I	1,4,5,6,7,8	In-person	In-class discussions	*Lambin et al. (2001) The cause of land-use and land-cover change: moving beyond the myths. Global Environmental Change *Geist & Lambin (2002) Proximate causes and underlying driving forces of tropical deforestation. Bioscience
9	Land systems II	1,2,4,5,7	In-person	In-class discussions	
10	Mapping the Environment	1,2,4,5,7	In-person	Computer tutorial	
11	A Telecoupled World	1,2,5,6,7	In-person	In-class discussions	* Liu et al. (2013) Framing Sustainability in a Telecoupled World. Ecology & Society *Nystrom et al. (2019) Anatomy and resilience of the global production ecosystem. Nature
12	Course overview	1,2,5,6,7	In-person	In-class discussions	
13	Oral exams	1,2,5,6,7	In-person		

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Lecture	Lectures will pass on theoretical knowledge required to understand major concepts and techniques used to study coupled-human and natural systems. There will also be time allocated for students to have an in-depth discussion and demonstrate practical applications of frameworks learned, questionnaire development and analysing land cover change.
Field trip	Field trips are important to bring students out of the classrooms and experience what types of changes are happening in land systems, how they occur and why they occur. We plan to have students interact with other students from an Indonesian university to exchange perspectives on changes in land systems and visit relevant field sites that allow students to understand the complexities of managing and governing land systems.

Assessment Structure

Assessment Components (includes both continuous and summative assessment)

No.	Component	ILO	Related PLO or Accreditation	Weightage	Description of Assessment Component	Team/Individual	Rubrics	Level of Understanding
1	Continuous Assessment (CA): Assignment(Written Assignment)	2,5,7		20		Individual	Analytic	Extended Abstract
2	Continuous Assessment (CA): Assignment(Peer Review Assignment)	5, 7, 8		15		Individual	Holistic	Relational
3	Continuous Assessment (CA): Test/Quiz(Review quiz)	1,3,4,6		30		Individual	Analytic	Multistructural
4	Continuous Assessment (CA): Class Participation([presentations])	5		10		Individual	Holistic	Not Applicable
5	Continuous Assessment (CA): Oral Test(Oral examination)	1,2,3,4,5,7		25		Individual	Holistic	Extended Abstract

Description of Assessment Components (if applicable)

Written Assignment

You will be tasked to write an essay and create a systems diagram about a CHNS case study. Any use of ChatGPT needs to be documented.

Peer Review Assignment

You will peer review each other's essay and fill in a peer review form on what you think about the written work. You will discuss the review with each other and share your experience of grading this work.

Review quiz

You will be tested with a mix of MCA and semi-structured questions (max 10 questions) in class (using pen and paper). Review quizzes will be conducted 3 times (each quiz contributes 10% of the assessment) in the semester. Review quizzes will be used to test your understanding of the concepts taught in class.

Class participation

You will be graded on your contribution to an online forum (e.g., Padlet) where review questions about the class (1. What did you take home from this lecture? 2. What question remains in your mind?) will be posed. You will also be graded on their contribution to in-class participation and discussion.

Oral exam

You will be given a list of questions for which you have to reflect on, prepare material and answer in an oral exam format. You will be interviewed one-one for a maximum of 15 min and explain in this period of time how they plan to answer the questions about the problem set and answer any questions from the instructor. You will be assessed on your grasp of content learned during the lecture and be given a chance to articulate your opinions and arguments. This allows you to critically examine your course material and evaluate your arguments before the instructor (me).

Formative Feedback

In-class reviews for Components 1, 2, & 3 will provide feedback to students' work. Students will receive both verbal and written feedback for component 5.

NTU Graduate Attributes/Competency Mapping

This course intends to develop the following graduate attributes and competencies (maximum 5 most relevant)

Attributes/Competency	Level
Care for Environment	Advanced
Care for Society	Advanced
Learning Agility	Advanced
Systems Thinking	Advanced

Course Policy

Policy (Academic Integrity)

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values. As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the academic integrity website for more information. On the use of technological tools (such as Generative AI tools), different courses / assignments have different intended learning outcomes. Students should refer to the specific assignment instructions on their use and requirements and/or consult your instructors on how you can use these tools to help your learning. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Policy (General)

You are expected to complete all assigned readings, activities, assignments, attend all classes punctually and complete all scheduled assignments by due dates. You are expected to take responsibility to follow up with assignments and course related announcements. You are expected to participate in all project critiques, class discussions and activities.

Policy (Absenteeism)

Absence from class without a valid reason will affect your overall course grade. Valid reasons include falling sick supported by a medical certificate and participation in NTU's approved activities supported by an excuse letter from the relevant bodies. There will be no make-up opportunities for in-class activities.

Policy (Others, if applicable)

Diversity and inclusion policy

Integrating a diverse set of experiences is important for a more comprehensive understanding of science.

It is our goal to create an inclusive and collaborative learning environment that supports a diversity of perspectives and learning experiences, and that honours your identities; including ethnicity, gender, socioeconomic status, sexual orientation, religion or ability.

To help accomplish this:

- If you are neuroatypical or neurodiverse, have dyslexia or ADHD (for example), or have a social anxiety disorder or social phobia;
- If you feel like your performance in the class is being impacted by your experiences outside of class;
- If something was said in class (by anyone, including the instructor) that made you feel uncomfortable;

Please speak to your teaching team, our school pastoral officer Christina Tee or a peer or senior (either in-person or via email) about how we can help facilitate your learning experience.

As a participant in course discussions, you should also strive to honour the diversity of your classmates. You can do this by: using preferred pronouns and names; being respectful of others opinions and actively making sure all voices are being heard; and refraining from the use of derogatory or demeaning speech or actions.

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- All members of the class are expected to adhere to the NTU anti-harassment policy. if you witness something that goes against this or have any other concerns, please speak to your instructors or a faculty member.

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Last Updated By: Nani Harniwati