ENR/ANTH 7004
SOCIAL-ECOLOGICAL SYSTEMS

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Meeting times: Weds. 9-12
Location: Kottman Hall 460
Office hours: By request

COURSE DESCRIPTION

This course provides an overview of frameworks, theories, concepts, and methods used in the interdisciplinary study of social-ecological systems. We will cover a wide range of conceptual frameworks, including complexity theory, complex adaptive systems, resilience, institutional analysis of social-ecological systems, ecosystem services, and coupled human and natural systems. We will critically analyze these frameworks and examine how they have been used to study human-environment interactions. The goal of the course is that students draw from these conceptual frameworks to develop a conceptual model for their own study of human-environment interactions. Students will also learn how to effectively collaborate in the interdisciplinary study of social-ecological systems.

COURSE GOALS

The goal is to train students to think theoretically about human-environment interactions as social-ecological systems, in which processes within and feedbacks between human and natural systems are critical for understanding the non-linear dynamics and emergent outcomes. This entails that students should be able to:

1. Understand the role of conceptual frameworks in shaping research on social-ecological systems.
2. Critically assess different theoretical frameworks that have been used describe and explain the dynamics of social-ecological systems.
3. Critically assess different modeling approaches that have been used to examine the dynamics of social-ecological systems.
4. Apply systems thinking to analyze human-environment interactions as social-ecological systems.
5. Develop a theoretical model for their own study of human-environment interactions.
6. Foster effective collaborations in interdisciplinary teams that analyze social-ecological systems.

OFFICE OF DISABILITY SERVICES STATEMENT

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

MENTAL HEALTH STATEMENT

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614 -292- 5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at 614 -292- 5766 and 24-hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1- 800 -273-TALK or at suicidepreventionlifeline.org.

TITLE IX STATEMENT

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at http://titleix.osu.edu or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu

DIVERSITY STATEMENT

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

COMMITTEE ON ACADEMIC MISCONDUCT STATEMENT

All students should become familiar with the rules governing academic misconduct, especially as they pertain to plagiarism and cheating. Ignorance of the rules is not an excuse and all alleged cases of academic misconduct will be reported to the Committee on Academic Misconduct (COAM).

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.

READINGS:

There is no required textbook for this course. All readings will be made available online through CARMEN. The daily readings are a critical part of this course.

EVALUATION and DUE DATES

1. Participation in class discussion

Students are expected be actively engaged in class; that is, coming to class prepared, paying attention, and contributing to discussions and problem solving, both by making comments and by facilitating other peoples' participation. Everyone is responsible for making the seminar an effective learning activity. This entails not only talking, but also listening and encouraging others to participate. Because of the nature of the course and the importance of discussion, *attendance at every class meeting is required*. Students should contact me if there is an emergency situation. In case of illness and absence, students are responsible for obtaining the notes and assignment information from a classmate.

Part of your participation grade will come from the discussion questions/topics that you post on the course website prior to each class. The questions themselves will not be graded but will give me insights into how you are reading and thinking about the course materials. The other part of the discussion grade will come from your contributions to class discussions.

There are three specific roles that students will occupy in each class period. You will be required to sign up for each of these roles at least once throughout the semester. The roles include (i) discussion facilitator, (ii) discussion recorder, and (iii) overall discussion "summarizer". You will sign up for these roles on the first day of class. **Please see the document "Discussion guidance, structure, and key roles" on the course website for descriptions and expectations for each role.**

2. Frameworks Comparison Paper (Draft 1 Due week 9; Final draft due during finals week)
Student teams will write a paper analyzing a human-environment interaction using at least two of the frameworks we'll have discussed in class (with the potential for including frameworks not covered in class as long as they are approved by the instructor in advance). **For full details, see the "Frameworks Comparison Paper" document in the "Assignments" module on the course website.**

For this paper, students are strongly encouraged to collaborate with at least one of their classmates, and are also strongly encouraged to collaborate with a classmate with a different disciplinary background (e.g. natural scientist + a social scientist, an engineer + and ecologist, or a psychologist + an anthropologist). The reason for this is that I am aiming to give you experience working in interdisciplinary teams as well as experience writing as a team). ***Students must get permission from me to write their paper alone or to collaborate with another student with a similar disciplinary background.***

The paper can be on any topic that falls within the umbrella of social-ecological systems – e.g., the research question of a particular group member or a topic of shared interest for which there is sufficient information in the literature. The paper must compare and contrast at least two different frameworks/perspectives.

The first draft of the paper should be between 3000 – 3500 words (not including title and citations) and formatted to use 1" margins, 1.5 spacing, and 12-point *Times New Roman* font. It will be written in two drafts. In addition to being graded by the instructor, the first draft will be peer reviewed to give practice with the peer review process.

3. Peer review (Due week 11)
Students will review the framework comparison paper of at least one other group. Peer reviewers should give critical and constructive feedback that will allow the authors to improve their final paper. Peer reviews should provide feedback regarding the clarity of writing and logic, the appropriate description and application of theories and frameworks, and interpretation of content. Students will be provided with guidance about standard approaches to peer review of scholarly work that will be posted on the course website. Students will then revise papers based on this input and additional input from the instructor and submit a final paper by the end of the quarter. Students will be given 500 words to deal with the changes suggested by reviewers. Thus, the final draft of the paper should be between 3500 and 4000 words.

4. Reflective essay (Due with final draft of paper during finals week)
Students will write a reflective essay in which they discuss the collaborative process of writing the final paper together. In the essay students will discuss specific challenges that they faced in the process of writing the paper, e.g., with language differences/jargon, epistemological differences, different perspectives on the most appropriate analytical scale(s) and how they overcame these challenges (or not). The reflective essay should focus on the process of interdisciplinary collaborations. If students received permission from me to write a paper alone, the reflective essay should address the challenges in integrating material from multiple

frameworks, perspectives, and disciplines throughout the class. The essay should be 4-5 pages in length and should be completed individually.

Course responsibilities will be weighted in the following way:

1. Participation in class discussions (including submission of discussion questions/topics and contributions in each of the three roles)	100 pts
2. First Draft of Framework Comparison Paper (Due week 9; Final version due during finals week)	25 pts
3. Peer review (Due week 11)	50 pts
4. Final Draft of Framework Comparison Paper (Due during finals week)	100 pts
5. Reflective essay (Due during finals week)	50 pts
Total	**325 pts**

GRADE SCALE

Final grades are based on the OSU Standard Scheme. A general guide to how you are doing is: A 93; A- 90-92; B+ 87-89; B 83-86; B- 80-82; C+ 77-79; C 73-76; C- 70-72; D+ 67-69; D 60-66; E< 60.

LATE ASSIGNMENTS

Submission of discussion questions/topics is required before the start of class so that facilitators can draw on them. If questions/topics are submitted after the start of class they will be considered missing.

All other assignments (peer review comments, final paper, reflective essay) *must* be **turned in hardcopy** to be graded. You will **also be required to submit a copy to the dropbox on Carmen,** but this is solely for your benefit.

You may turn in assignments **up to 4 days** late (four actual days, not class days, e.g. if the paper is due on Wednesday, then Sunday is the last day I will accept a paper). However, you will lose a full letter grade for each day it is late. **You must have a documented excuse *prior to the assignment due date* for me to accept a paper after the due date without this penalty.**

There are three situations that constitute an "excused absence" from class: 1) students who participate in a *documented* University sanctioned event, 2) students who have a *documented* death in the family, and 3) students who have received *documented* medical attention for an illness.

COURSE SCHEDULE AND SAMPLE READINGS
***** NOTE – these readings are subject to change. The actual readings assigned for the class will be posted on the page dedicated to each class session at least 3 weeks prior to the date of that session.**

Jan. 8th - Week 1: Introduction to conceptual frameworks

- **Chapters 1, 2, and 7 from**: Ravitch, Sharon M., and Matthew Riggan. 2012. Reason & Rigor: How conceptual frameworks guide research. Los Angeles (CA): Sage.
- **Chapter 2 from:** Shore, Zachary. 2016. How to Read & How to Critique in Grad School Essentials: A crash course in scholarly skills. Berkeley (CA): University of California Press.
- **Schlager 2007** in *Theories of the Policy Process – edited by Paul Sabatier.*

Jan 15th - Week 2: Interdisciplinary collaborations

- Bosque-Pérez et al. 2016. A Pedagogical Model for Team-Based, Problem-Focused Interdisciplinary Doctoral Education. BioScience 66 (6):477-488.
- Miller, T. R., et al. . 2008. Epistemological pluralism: reorganizing interdisciplinary research. Ecology and Society 13 (2):46.
- Eigenbrode, S.D., et al. (2007). Employing Philosophical Dialogue in Collaborative Science. Bioscience. 57(1). 55.
- Record, Sydne at el. (2016). Graduate students navigating social-ecological research: insights from the Long-Term Ecological Research Network. Ecology and Society 21 (1): 17.

Jan 22nd - Week 3: Systems thinking

- Loorbach, D., Frantzeskaki, N., & Avelino, F. (2017). Sustainability Transitions Research: Transforming Science and Practice for Societal Change. *Annual Review of Environment and Resources*, 42, 599-626.
- Rappaport, Roy A. 1971. Ritual, Sanctity, and Cybernetics. American Anthropologist. 73(1): 59-76
- Chapters 1-5 from Meadows, Donella H. 2008. Thinking in Systems: A Primer. Chelsea Green Publishing.

Jan. 29th - Week 4: Complexity and Complex adaptive systems

- Excerpts from Mitchell, Melanie. 2009. *Complexity: a guided tour*. Oxford (UK): Oxford University Press.
- Lansing, J. Stephen. 2003. Complex Adaptive Systems. Annual Review of Anthropology 32(1):183-204.

- Agar, Michael. 2004. We Have Met the Other and We're All Nonlinear: Ethnography as a Nonlinear Dynamic System. Complexity 10 (2):16-24.
- Excerpts from Lansing, J. Stephen. 2006. Perfect order: recognizing complexity in Bali. Princeton (NJ): Princeton University Press.
- Levin, Simon, et al. 2012. Social-ecological systems as complex adaptive systems: modeling and policy implications. Environment and Development Economics 18 (02):111-132.

Feb 5th - Week 5: Human decision-making and the environment

- Simon, H. A. (1985). Human Nature in Politics: The Dialogue of Psychology with Political Science. *The American Political Science Review*, 79 (2): 293-304
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185, 1124-1131.
- Kahneman, D. (2003) "A Perspective on Judgment and Choice: Mapping Bounded Rationality." *American Psychologist*, 58 (9): 697-720.
- Kahneman, D., & Klein, G. (2009). Conditions for intuitive expertise: a failure to disagree. *American psychologist*, *64*(6), 515.
- Gigerenzer, G., Goldstein, D. (1996). "Reasoning the Fast and Frugal Way: Models of Bounded Rationality." *Psychological Review*, 103(4): 650-669.

Feb 12th - Week 6: SES Framework

- Ostrom, E. (2009). A general framework for analyzing sustainability of social-ecological systems. *Science*, *325*(5939), 419-422.
- Leslie et al. (2015) Operationalizing the social-ecological systems framework to assess sustainability. *PNAS.*
- Hinkel et al (2015) A diagnostic procedure for applying the social-ecological systems framework in diverse cases. *Ecology and Society*

Feb 19th - Week 7: CHANS Framework

- Liu, Jianguo, et al. . 2007. Complexity of Coupled Human and Natural Systems. *Science* 317 (5844):1513-1516.
- Moritz, Mark, et al. 2016. Studying the Logone Floodplain, Cameroon as a Coupled Human and Natural System. *African Journal of Aquatic Sciences* 41 (1):99-108.
- Spies et al (2014) Examining fire-prone forest landscapes as coupled human and natural systems. *Ecology and Society.*

Feb 26th - Week 8: Resilience, vulnerability, and adaptive capacity

- Carpenter, S., Walker, B., Anderies, J. M., & Abel, N. (2001). From metaphor to measurement: resilience of what to what? *Ecosystems*, *4*(8), 765-781.
- Folke, C. (2006). Resilience: The emergence of a perspective for social–ecological systems analyses. *Global Environmental Change* 16 (3): 253-267.
- Anderies, J., Folke, C., Walker, B., & Ostrom, E. (2013). Aligning key concepts for global change policy: robustness, resilience, and sustainability. *Ecology and society*, *18*(2).
- Walker, B., Carpenter, S., Anderies, J., Abel, N., Cumming, G., Janssen, M., ... & Pritchard, R. (2002). Resilience management in social-ecological systems: a working hypothesis for a participatory approach. *Conservation ecology*, *6*(1).
- Olsson, P., Folke, C., & Berkes, F. (2004). Adaptive comanagement for building resilience in social–ecological systems. *Environmental management*, *34*(1), 75-90.

March 4th - Week 9: Ecosystem services

- Biggs, Reinette, Maja Schluter, and Michael L. Schoon, eds. 2015. Principles for Building Resilience Sustaining Ecosystem Services in Social-Ecological Systems. Cambridge (UK): Cambridge University Press.
- Boumans, Roelof, Joe Roman, Irit Altman, and Les Kaufman. 2015. The Multiscale Integrated Model of Ecosystem Services (MIMES): Simulating the interactions of coupled human and natural systems. *Ecosystem Services* 12:30-41.

***** First draft of paper is due.**

******* SPRING BREAK *******

March 18th - Week 10: Political Ecology

- Social-ecological systems, social diversity, and power insights from anthropology and political ecology Author(s): Michael Fabinyi, Louisa Evans and Simon J. Foale Source: Ecology and Society, Vol. 19, No. 4 (Dec 2014)
- Turner (2013) Political ecology: an alliance with resilience? Progress in Human Geography.
- Turner and Robbins (2008) Land change science and political ecology: similarities, differences, and implications for sustainability science. Annual Review of Environment and Resources

March 25th - Week 11: Institutions, collective action, governance, polycentricity

- Berardo, R. & Lubell, M. (2016). Understanding what shapes a polycentric governance system. *Public Administration Review*, 76(5), 738-751.

- Carlisle, K. and Gruby, R. L. (2017), Polycentric Systems of Governance: A Theoretical Model for the Commons. *Policy Stud Journal*. doi:10.1111/psj.12212
- Ostrom, V., Tiebout, C. M., & Warren, R. (1961). The organization of government in metropolitan areas: a theoretical inquiry. *American Political Science Review*, *55*(04), 831–842.
- Ostrom, E. (2010). Polycentric systems for coping with collective action and global environmental change. *Global Environmental Change*, *20*(4), 550-557.

***** Peer-review of paper is due.**

April 1st - Week 12: Evolution of social-ecological systems (cultural evolution and cMLS)

- Waring et al (2015) A multilevel framework for sustainability analysis. *Ecology and Society*
- Richerson and Henrich (2012) Tribal social instincts and the cultural evolution of institutions to solve collective action problems. *Cliodynamics*
- Brooks et al (2018) Re-examining Balinese subaks through the lens of cultural multilevel selection. *Sustainability Science.*
- Andrews and Borgerhoff Mulder (2018) Cultural group selection and the design of REDD+: insights from Pemba. *Sustainability Science.*

April 8th –Week 13: Modelling

- Smaldino, P. E. (2016). Models Are Stupid, and We Need More of Them. Computational Models in Social Psychology, edited by R. R. Vallacher, A. Nowak, & S. J. Read. Forthcoming in 2016 from Psychology Press.
- Kohler et al. 2007: Historical Socionatural Systems and Models
- Epstein, Joshua M. 2008. Why Model? Journal of Artificial Societies and Social Simulation. 11(412)
- Waring et al. (2017). The coevolution of institutions and sustainable consumption via cultural group selection. Ecological Economics. 131: 524 – 532.

April 15th - Week 14: Synthesis

- Bousquet, F. et al. 2015. Social-Ecological Theories and Empirical Research: Comparing Social-Ecological Schools of Thought in Action. Research Report. CIRAD-Green.

*** The final paper and reflection essay are due during Finals week.

LEARNING OUTCOMES

1. Understand the role of conceptual frameworks in shaping research on social-ecological systems.
    a. Explain what a conceptual framework is
    b. Explain how conceptual frameworks shape research
2. Critically assess the different conceptual frameworks that have been used describe and explain the dynamics of social-ecological systems.
    a. List the main conceptual frameworks
    b. Explain frameworks, key concepts, and the questions they addressed
    c. Discuss the strengths and weaknesses of conceptual frameworks
    d. Describe how the frameworks have shaped other conceptual frameworks
    e. Compare and contrast different conceptual frameworks
    f. Explain contributions to the study of social-ecological systems
3. Critically assess different modeling approaches that have been used to examine the dynamics of social-ecological systems.
    a. Describe different modeling approaches to social-ecological systems
    b. Discuss the strengths and weaknesses of different modeling approaches
    c. Explain how modeling contributes to study of social-ecological systems
4. Apply systems thinking to analyze human-environment interactions as social-ecological systems.
    a. Explain models, concepts and questions of conceptual frameworks
    b. Identify the components, interactions, and processes in systems
    c. Apply conceptual tools to describe and explain a social-ecological system
5. Develop a conceptual model for their own study of human-environment interactions.
    a. Construct their own conceptual model
    b. Use relevant and appropriate theoretical frameworks
    c. Articulate clearly and logically their own conceptual model
    d. Convince reader of importance of topic and rigor of approach
6. Foster effective collaborations in interdisciplinary teams that analyze social-ecological systems.
    a. Recognize the disciplinary perspectives and expertise of self and other team members.
    b. Value the disciplinary perspective and expertise of self and other team members.
    c. Leverage the diversity of the disciplinary perspectives and expertise to analyze social-ecological systems.