

CSUS 300
Theoretical Foundations of Sustainability

Spring 2015
Monday and Wednesday, 12:40-2:00 p.m.
152 Natural Resources Building

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Catalog Course Description: Foundations of sustainability theory. History and evolution of interdisciplinary thought about sustainability. Principles of systems thinking as applied to complex problems. Application of theory in community systems.

Course Learning Outcomes: Students who complete this course will:

1. Demonstrate the ability to frame complex problems from a systems perspective.
2. Distinguish between and connect functional integrity and resource sufficiency as global perspectives on sustainability.
3. Describe and demonstrate understanding of evolutions in the thinking about sustainability in various disciplinary/theoretical contributions (ethics, economics, ecology, engineering, business).
4. Discuss sustainability critically as a wicked problem, drawing from two or more paradigms for sustainability.
5. Explain community engagement as a vehicle for embracing and benefiting from multiple knowledge cultures/ways of knowing.

These course outcomes support the Department of Community Sustainability undergraduate program competencies of critical thinking, systems thinking, and ethics. Successful completion of this course provides students with the background needed to frame complex problems and address them systemically in order to successfully complete additional courses in the major. Students can learn more about the Department of Community Sustainability undergraduate program competencies at http://www.csus.msu.edu/undergraduate/sustainability_core. In addition, this course supports Michigan State University's Undergraduate Learning Goals of analytical thinking and integrated reasoning. More information about MSU's Undergraduate Learning Goals is available at <http://undergrad.msu.edu/msu-goals>.

Course Overview: As the title implies, this course will introduce students to some bodies of theory that provide foundations for understanding, pursuing practical objectives of, and researching new approaches to sustainability. Sustainability is generally understood to require integration of theory and methods from a number of different scientific disciplines. Our approach is to suggest that two or possibly three distinct paradigms guide sustainability science today. One is grounded in the debate over limits to economic growth and the indefinite expansion of resource utilization implied by global economic development and increasing human population. Another is grounded in both social and environmental scientists' growing understanding of the fragility and vulnerability of the socio-technical and ecological systems on which human beings depend. These paradigms are not unrelated. Both have been influenced by the development of general systems theory since World War II. But the first, which we will call *resource sufficiency*, understands systems as engines that generate useful products and services, while the second, which we will call *functional integrity*, sees systems as having intrinsic value, or at least as being important in and of themselves. A possible third way lies in process-oriented adaptations of systems theory: the emphasis is on using systems thinking to better engage and respect participants and affected parties.

Course Methods: We will rely heavily on reading and class discussion of materials that articulate and analyze the key theoretical concepts and perspectives noted above. We will also use case studies as ways to both motivate and explore the implications of different theoretical approaches to sustainability. In addition, a semester class project will provide an opportunity for learning by doing. The class project will allow students to use tools, methods and ideas from previous coursework and life experience and to integrate their prior knowledge with material from this class in a practical activity with a partner organization (the MSU Office of Campus Sustainability). Student performance will be evaluated in accordance with the activities discussed below under **Grading**.

Required Text:

D. Meadows. 2008. *Thinking in Systems: A Primer*. White River Junction, VT: Chelsea Green Publishing

This text will be supplemented with articles and reports posted on MSU's Desire to Learn (D2L) site (<https://d2l.msu.edu>).

Grading:

<u>Grading Scale:</u>	Grade	Percentage
	4.0	93 - 100%
	3.5	87.5 - 92.9%
	3.0	82.5 - 87.4%
	2.5	77.5 - 82.4%
	2.0	72.5 – 77.4%
	1.5	67.5 – 72.4%
	1.0	62.5 – 67.4%
	0.0	under 62.4%

Assessment:

Homework	20%
Midterm Examination	20%
Final Examination	20%
Class Participation	20%
Semester Legacy Project	20%

Homework: (100 points possible) Homework is written work to be done outside of class and consists of ten equally weighted assignments worth 10 points each. Homework assignments will be posted on D2L. Some assignments will be based on work being discussed in class and some will require additional out of class research. Some homework assignments will be submitted through D2L; others will need to be brought to class on a specific date (each assignment will specify how it is to be submitted).

Submission of homework assignments after the assigned deadline will result in a reduction of 2 points for each 24 hours beyond the deadline.

Midterm and Final Exams: Each worth 100 points, to be done in class on Feb. 23 and May 7 (final exam week) respectively. If you must miss an exam, please inform an instructor as soon as you are aware of the conflict so that appropriate arrangements or accommodations can be made.

Class Participation: The class participation grade will be broken down as follows:

- *General Attendance* (20 points possible): Participation and interaction with other students is a required component of this class. It is impossible to fulfill this requirement if you are not present for class meetings. Attendance will be taken each class day except August 27 and November 26. Students who have three absences or fewer will receive all 20 possible points. 2 points will be deducted for each absence in excess of three. NOTE WELL: The three day grace period is expected to cover university excused absences including illness, family emergencies and university sanctioned activities such as student clubs, organizations or activities associated with other classes. It is also expected to cover absences that occur because of late enrollment in the class, and other exigencies that students experience throughout the semester. There will not be exceptions to this policy except in extremely unusual circumstances. If you anticipate problems complying with this requirement, *notify an instructor as soon as you become aware of the problem!* Note that we may advise you to dis-enroll (i.e., drop the class) in the event of excessive absences. It is not necessary to notify instructors or present excuses for specific absences.
- *Prepared Discussions* (30 points possible): Five class days are organized as "Prepared Discussions" (Jan. 28, February 9, March 4, March 30 and April 29). On any of these days, you can earn up to 10 points by coming to class and demonstrating that you are prepared to participate actively in the discussion. Grades for prepared discussions will be based on your 3 best performances (i.e., no partial credit carrying over to the next discussion), and a maximum of 30 points may be earned.
- *Online Discussions* (50 points possible): Five discussion rooms will be run on D2L from Jan. 12 to Jan. 28, from Feb. 2 to Feb. 13; from Feb. 16 to March 16; from March 16 to

April 6; from April 6 to May 1. **For full credit, you must participate in each of the five discussion rooms.**

To earn points in a discussion room make posts that *either* a) responds to one of the prompt questions in the discussion room, or b) makes a comment on a post that has already been made by another student.

The rules: Be respectful and constructive in all posts. **You must make at least two (2) posts during the period that the room is open in order to be eligible to earn points.** Posts should normally be in the range of 100-200 words (much longer than tweets), and **posts of less than 50 words will not be counted** toward the two post minimum. All posts must be your own words (no pasting blocks of copied text)!

Grades for online discussions will be based on the following scale: *Highly Substantive:* 10 points—two or more posts that do a very good job of addressing the point under discussion, and in the case of a reply that makes a constructive and helpful comment (critical or not) that builds upon someone's earlier post; *Adequate:* 8 points—two or more posts that are on point and are consistent with all the above rules. *In the ballpark:* 6 points—two or more posts that are recognizably addressing topics related to the class and are consistent with the above rules; *No, not really:* 4 points—two or more posts of at least 50 words expressing a grammatically meaningful thought in the English language.

Semester Legacy Project: (100 points possible) Students will complete the semester legacy project in teams. Each team will engage with MSU's Office of Campus Sustainability (<http://sustainability.msu.edu>) and selected units on campus in a project to assist with assessment and planning for MSU's water system.

Grades for the Legacy Project will be based on four components:

1. The use of systems thinking in the team's work
2. The quality of the team's written report
3. The quality of the team's presentation
4. Participation of the team in meeting the project goal
5. The quality of your work as a team member, based on your reflection and that of your fellow team members

Technology Use:

While in class, students should put their cell phones to silent or turn them off. Also, sending and receiving text or e-mail messages during class are distracting to students and instructors. Instructors may call out students who are using their phones excessively during class and ask them to stop.

Accommodations for Students with Disabilities: Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at rcpd.msu.edu. Once your eligibility for an accommodation has been determined, you will be issued a Verified Individual Services Accommodation ("VISA") form. Please present this form to an instructor during the

second week of class and/or two weeks prior to the accommodation date (test, project, etc.). Requests received after this date may not be honored.

Academic Integrity:

[Article 2.III.B.2](#) of the Academic Freedom Report states: “The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards.” In addition, the Department of Sustainability adheres to the policies on academic honesty specified in General Student Regulation 1.0, [Protection of Scholarship and Grades](#); the all-University Policy on [Integrity of Scholarship and Grades](#); and [Ordinance 17.00](#), Examinations.

Therefore, unless authorized by your instructor, you are expected to complete all course assignments, including homework, tests and exams, without assistance from any source. You are expected to develop original work for this course; therefore, you may not submit course work you completed for another course to satisfy the requirements for this course. Also, you are not authorized to use the www.allmsu.com Web site to complete any course work in this course. Students who violate MSU regulations on Protection of Scholarship and Grades will receive a failing grade in the course or on the assignment.

Instances of plagiarism constitute academic dishonesty and will result in a grade of zero for the assignment in which plagiarism occurs. See <https://www.msu.edu/unit/ombud/academic-integrity/plagiarism-policy.html> for a definition and discussion of plagiarism.

Faculty are required to report all instances in which a penalty grade is given for academic dishonesty. Students reported for academic dishonesty are required to take an online course about the integrity of scholarship and grades. A hold will be placed on the student's account until such time as the student completes the course. This course is overseen by the Associate Provost for Undergraduate Education.

Citations and references:

The APA format should be used for any in-text citations and reference lists when you rely on information from other sources for writing homework assignments and the final project report. A good reference site for APA style can be found at <https://owl.english.purdue.edu/owl/resource/560/01/>.

Class Schedule:

Date	Topic	Assignment Due
Mon 1/12	Introductions, review syllabus, class expectations Online discussion room #1 open until Jan. 28	
Wed 1/14	Easter Island case study	Read on D2L: T. Prugh and E. Assadourian, "What is sustainability, anyway?"
Wed 1/21	Dust Bowl case study	Read on D2L: C. Ponting, "The foundations of history" Homework #1 due
Mon 1/26	What should we expect from a theory of sustainability?	Scan: "Theory" http://en.wikipedia.org/wiki/Theory Read carefully: "Scientific theory" http://en.wikipedia.org/wiki/Scientific_theory "Heuristic" http://en.wikipedia.org/wiki/Heuristic "Paradigm" http://en.wikipedia.org/wiki/Paradigm "Environmental indicators" http://en.wikipedia.org/wiki/Environmental_indicators
Wed 1/28	Why is sustainability a wicked problem? Prepared discussion	Read on D2L: S. Batie, "Taking conservation seriously as a wicked problem" Watch on D2L: https://www.youtube.com/watch?v=lv2xfpOpKJE https://www.youtube.com/watch?v=v15LMXhHdB4 Homework #2 due
Mon 2/2	Systems thinking, Part I Online discussion room #2 open until Feb. 13	Read: Meadows, <i>Thinking in Systems</i> , pp. 1-72
Wed 2/4	Systems thinking, Part II	Read: Meadows, pp. 73-110 Homework #3 due
Mon 2/9	Systems thinking, Part III Prepared discussion	Read: Meadows, pp. 111-165
Wed 2/11	What is Capital?	Read on D2L: M. Common and S. Stagl, "The economy"; S. El Serafy, "The environment as capital"
Mon 2/16	How economics views sustainability, Part I Online discussion room #3 open until March 16	Read on D2L: R. Solow, "An almost practical step toward sustainability"

Wed 2/18	How economics views sustainability, Part II	Read on D2L: "An Alaskan's guide to the permanent fund"; J. Gowdy and L. Krall, "The fate of Nauru and the global financial meltdown"; J. Rowe, "Our phony economy" Homework #4 due
Mon 2/23	Midterm exam	
Wed 2/25	Sustainability in supply chain management	Read on D2L: TBD
Mon 3/2	Engineering, life cycle assessment and sustainability	Read on D2L: M. Heller and G. Keoleian, "Assessing the sustainability of the U.S. food system: A life cycle perspective"
Wed 3/4	Prepared discussion: Legacy project reports and strategic planning	Homework #5 due
3/9 and 3/11 – Spring Break		
Mon 3/16	How ecology views sustainability, Part I Online discussion room #4 open until April 6	Read on D2L: T. Vold and D. Buffett, "Ecological principles"
Wed 3/18	How ecology views sustainability, Part II	Read on D2L: F. Spellman, "Biodiversity"
Mon 3/23	Sustainability ethics	Read on D2L: TBD Homework #6 due
Wed 3/25	Social justice and sustainability	Read on D2L: TBD
Mon 3/30	Resource sufficiency, Part I	Read on D2L: A. Trewavas, "Malthus foiled again and again"; P. Ehrlich and A. Ehrlich, "The population bomb revisited" Homework #7 due
Wed 4/1	Resource sufficiency, Part II Prepared discussion	Read on D2L: H. Daly, "Toward some operational principles of sustainable development"
Mon 4/6	Functional integrity, Part I Online discussion room #5 open until May 1	Watch on D2L: The Crisis of Credit Visualized Read on D2L: A. Zolli and A. Healy, "The resilience imperative"; D. Orr, "Living and breathing in a 'black swan' world" Homework #8 due
Wed 4/8	Functional integrity, Part II	Read on D2L: D. Callicott and K. Mumford, "Ecological sustainability as a conservation concept"
Mon 4/13	Ways of knowing, Part I	Read on D2L: "Ways of knowing" Homework #9 due
Wed 4/15	Ways of knowing, Part II	Read on D2L: TBD
Mon 4/20	Sustainability science	Read on D2L: S. Funtowicz and G. Ravetz,

		"Uncertainty, complexity and post-normal science";
Wed 4/22	Engagement	Read on D2L: V. Brown, "Collective inquiry and its wicked problems" Homework #10 due
Mon 4/27	Connecting the dots	Read: Meadows, pp. 166-185
Wed 4/29	Legacy project reports and creating the framing document Prepared discussion	
Thurs 5/7	Final Exam 12:45-2:45 p.m.	