

Term Information

Effective Term Autumn 2023
Previous Value Spring 2021

Course Change Information

What change is being proposed? (If more than one, what changes are being proposed?)

Request to be part of Sustainability GE and updates to expected learning outcomes to meet requirements; increase in credit hours from 3 to 4, addition of lab section; addition of all campuses as available offerings as required by new GE; course number has been updated as requested.

What is the rationale for the proposed change(s)?

To align with the new GE

What are the programmatic implications of the proposed change(s)?

(e.g. program requirements to be added or removed, changes to be made in available resources, effect on other programs that use the course)?

n/a

Is approval of the request contingent upon the approval of other course or curricular program request? No

Is this a request to withdraw the course? No

General Information

Course Bulletin Listing/Subject Area Agricul Envrmtl & Develop Econ
Fiscal Unit/Academic Org Agric, Envrmtl & Devlp Econ - D1114
College/Academic Group Food, Agric & Environ Science
Level/Career Undergraduate
Course Number/Catalog 2501
Previous Value 2500
Course Title Introduction to Sustainability
Transcript Abbreviation Intro Sustainbly
Course Description Introduces students to principles from various disciplines related to social, economic and environmental sustainability. Students will evaluate key concepts and examine tradeoffs that are a part of sustainability action using case studies representing diverse perspectives.
Semester Credit Hours/Units Fixed: 4
Previous Value Fixed: 3

Offering Information

Length Of Course 14 Week, 12 Week, 8 Week, 7 Week, 6 Week, 4 Week
Flexibly Scheduled Course Never
Does any section of this course have a distance education component? Yes
Is any section of the course offered 100% at a distance
Greater or equal to 50% at a distance
Less than 50% at a distance
Grading Basis Letter Grade
Repeatable No
Course Components Laboratory, Lecture
Previous Value Lecture
Grade Roster Component Lecture

COURSE CHANGE REQUEST
2501 - Status: PENDING

Last Updated: Osborne, Jeanne Marie
11/09/2022

Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus, Lima, Mansfield, Marion, Newark, Wooster
Previous Value	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	Prereq: Soph standing, or permission of instructor.
Exclusions	Not open to students with credit for ENR 2501.
Previous Value	
Electronically Enforced	Yes

Cross-Listings

Cross-Listings	Cross-listed in ENR.
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Subject/CIP Code

Subject/CIP Code	01.0103
Subsidy Level	Baccalaureate Course
Intended Rank	Sophomore, Junior, Senior

Requirement/Elective Designation

Required for this unit's degrees, majors, and/or minors
Sustainability
The course is an elective (for this or other units) or is a service course for other units

[Previous Value](#)

[Required for this unit's degrees, majors, and/or minors](#)
[The course is an elective \(for this or other units\) or is a service course for other units](#)

Course Details

Course goals or learning objectives/outcomes

- Recall and critically assess various depictions, definitions, and conceptualizations of sustainability, sustainable development, and resilience.
- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Define the concepts of “justice”, “power” and “inequality”, and explain how they shape our understanding of sustainability as well as our understanding of how sustainability efforts can have different impacts on different communities
- Describe how a scientific approach is important to examine the connections, tradeoffs, and synergies across environmental, economic, and social components that are involved in achieving sustainability goals
- Demonstrate an appreciation of how ecosystem function changes in response to human and nonhuman influences, how humans use and impact ecosystem services, and the implications of these human-environment interactions for sustainability
- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability

Previous Value

- *Recall and critically assess various definitions of sustainability and sustainable development*
- *Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.*
- *Describe how a scientific approach is important for examining the connections, tradeoffs, and synergies across environmental, economic, and social components that are involved in achieving sustainability goals*
- *Demonstrate an appreciation of how ecosystem function changes in response to human and nonhuman influences, how humans use and impact ecosystem services, and the implications of these human-environment interactions for sustainability.*
- *Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others*
- *Demonstrate a basic understanding of how organizations, markets, and institutions can help and hinder achievement of a sustainable society.*
- *Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales.*
- *Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability.*

Content Topic List

- Overview of the Anthropocene & Introduction to Sustainability: General overview, definitions and key concepts
- Economic and business concepts and overview of development, poverty, community & inequality
- Population and consumption
- Economic and Business perspectives on consumption
- Social, psychological, and anthropological perspectives on why we consume
- How can we consume more sustainably?
- Sustainability and Water
- The economics of water quality and quantity
- Water and community development
- Water and international development
- Business and Water
- Introduction to Climate/Energy
- Climate/Energy - economics and business
- Climate/Energy and international development
- Climate/energy and communities
- Trends in biodiversity
- Biodiversity and sustainable development
- Communities and Conservation
- Biodiversity and community development
- Biodiversity and economics
- Synthesis and integration – returning to the pillars of sustainability

Previous Value

- *Introduction to Sustainability I:*
General overview, definitions and key concepts
- *Introduction to Sustainability II – Economic and business concepts and overview of development*
- *Introduction to consumption and why we consume*
- *Business perspectives on consumption*
How can we consume more sustainably?
- *Introduction to Water*
The economics of water quality and quantity
- *Water, communities and international development*
- *Business and Water*
- *Introduction to Climate/Energy*
Climate/Energy - economics and business
- *Climate/Energy and international development*
- *Introduction to biodiversity and sustainable community development*
- *Biodiversity and international development*
- *Biodiversity and economics*

Sought Concurrence

No

COURSE CHANGE REQUEST
2501 - Status: PENDING

Last Updated: Osborne, Jeanne Marie
11/09/2022

Attachments

- ENR_AEDE _2501_ interdisciplinary-team-taught-inventory.pdf
(Other Supporting Documentation. Owner: Zimmerman, Kathleen D)
- ENR_AEDE 2501_Distance Approval Cover Sheet_For Online Section.docx
(Other Supporting Documentation. Owner: Zimmerman, Kathleen D)
- ENR_AEDE 2501_Distance Approval Cover Sheet_in person offering (1).docx
(Other Supporting Documentation. Owner: Zimmerman, Kathleen D)
- ENR_AEDE _2501_GE_Sustainability Theme.pdf
(Other Supporting Documentation. Owner: Zimmerman, Kathleen D)
- IN_PERSON_ENR_AEDE 2501_Syllabus for GE approval_R1.docx
(Syllabus. Owner: Zimmerman, Kathleen D)
- Cover letter for ENR 2500 GE submission_online revision.docx
(Cover Letter. Owner: Zimmerman, Kathleen D)
- ONLINE_ENR_AEDE 2500_Syllabus for GE approval_R3.docx
(Syllabus. Owner: Zimmerman, Kathleen D)

Comments

- Sara Fries submitted on behalf of ENR. Updated cover letter and online syllabus. *(by Zimmerman, Kathleen D on 11/09/2022 03:08 PM)*
 - Please see Panel feedback email sent 10/13/2022. *(by Hilty, Michael on 10/13/2022 11:33 AM)*
 - Revise as per COAA via email message 7 February 2022
- Revise as per email 28 January 2022 *(by Osborne, Jeanne Marie on 02/07/2022 03:57 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Zimmerman, Kathleen D	01/24/2022 01:53 PM	Submitted for Approval
Approved	Roe, Brian Eric	01/24/2022 02:05 PM	Unit Approval
Revision Requested	Osborne, Jeanne Marie	01/28/2022 10:53 AM	College Approval
Submitted	Zimmerman, Kathleen D	02/03/2022 02:49 PM	Submitted for Approval
Approved	Roe, Brian Eric	02/03/2022 02:56 PM	Unit Approval
Revision Requested	Osborne, Jeanne Marie	02/07/2022 03:57 PM	College Approval
Submitted	Zimmerman, Kathleen D	02/11/2022 03:09 PM	Submitted for Approval
Approved	Roe, Brian Eric	02/11/2022 03:17 PM	Unit Approval
Approved	Osborne, Jeanne Marie	02/11/2022 03:23 PM	College Approval
Revision Requested	Hilty, Michael	04/08/2022 02:24 PM	ASCCAO Approval
Submitted	Zimmerman, Kathleen D	09/09/2022 02:39 PM	Submitted for Approval
Approved	Roe, Brian Eric	09/09/2022 02:39 PM	Unit Approval
Approved	Osborne, Jeanne Marie	09/09/2022 04:33 PM	College Approval
Revision Requested	Hilty, Michael	10/13/2022 11:33 AM	ASCCAO Approval
Submitted	Zimmerman, Kathleen D	11/09/2022 03:08 PM	Submitted for Approval
Approved	Roe, Brian Eric	11/09/2022 03:18 PM	Unit Approval
Approved	Osborne, Jeanne Marie	11/09/2022 03:23 PM	College Approval
Pending Approval	Cody, Emily Kathryn Jenkins, Mary Ellen Bigler Hanlin, Deborah Kay Hilty, Michael Vankeerbergen, Bernadette Chantal Steele, Rachel Lea	11/09/2022 03:23 PM	ASCCAO Approval

Dear Dr. Conroy and Panel Members,

We would like to thank the Sustainability Theme Panel of the ASC Curriculum Committee for their feedback on the materials for our 4-credit, High-Impact Practice: Interdisciplinary Team-Teaching course proposal for AEDE/ENR 2501 – *Introduction to Sustainability*. We appreciate the support for the in-person section that we worked very hard to develop and, in this round of revisions, we focus only on feedback we received on the online version of the course.

We are responding to this comment and suggestion

- The reviewing faculty find the in-person version of this course to be an excellent example of a High-Impact, Interdisciplinary Team-Taught course and thank the unit for developing a wonderful course. **However, the distance-learning version of the course does not appear to be the same rigor as the in-person version of the course. They ask that the departments incorporate elements from the in-person proposal into the distance version and strongly encourage the departments to convert the distance learning version of the course to a fully synchronous course, rather than have significant asynchronous elements as currently proposed.**

We have integrated language from the in-person version of the course to clarify the mechanisms and structures we will use to ensure that students are exposed to (and will actively integrate) multiple disciplinary perspectives on each topic. These changes are highlighted in the attached syllabus. Specifically, we describe the process depicted below whereby, in each week, one instructor will create and post lecture materials while the other will create assigned discussion prompts for that week. These discussion prompts will mimic the discussions covered in the in-person class because they will be designed to make students compare, contrast, and evaluate how different disciplines think about a topic and potential solutions. To accommodate this change, we also replaced the weekly quizzes with these weekly discussion prompts (see highlighted changes in the syllabus). In addition, we note that the weekly lab sections are already synchronous and instructors will rotate through lab sections throughout the semester.

Example Topic: Climate Change and Energy		
	Lecture materials (videos, readings, etc.)	Weekly Discussion Prompts
Week 1	Climate/energy: economics and business of climate mitigation and adaptation (posted by Instructor A)	<i>Posted by Instructor B (e.g. questions will focus on a critical evaluation of economic approaches to addressing climate change and the mech</i>
Week 2	Climate/energy: Community development and climate mitigation and adaptation in domestic and international contexts (posted by Instructor B)	<i>Posted by instructor A (e.g. questions will focus on whether and how theories and approaches from other social science disciplines will produce outcomes that are more or less “sustainable” than strictly economic approaches</i>

However, we disagree with the recommendation to convert the distance learning version of the course to a fully synchronous course. This recommendation appears to be based on the assumption that a synchronous course would be more rigorous than an asynchronous course and we are unclear on the basis for this assumption.

It is our understanding that synchronous courses are not inherently more rigorous than asynchronous courses. OSU's own materials emphasize that both synchronous and asynchronous courses can have the same rigor: <https://it.osu.edu/news/2020/06/23/whats-difference-between-asynchronous-and-synchronous-learning>. In addition, other literature has indicated that synchronous and asynchronous courses can be used for different purposes and that asynchronous courses can foster deeper levels of thinking while synchronous courses may be better for community building and faster information exchange (i.e. back and forth discussions) (Hratinski 2008). Either modality (just like in person and hybrid) can have good and bad courses. Neither are inherently of higher or lower quality or rigor. Instead, what's most important is good course design and instructor presence.

As further support, a recently published study examined the effects of a curriculum intervention in an interdisciplinary sustainability course that had in-person, asynchronous online, and blended learning with and across different years (Gilbertz et al. 2022). This study found that "...sustainability knowledge significantly improved for online students, but not for students in the blended section (fall 2020) as compared to in-person students (fall 2018)" and concluded that, "The results also suggest that online courses can continue to produce high learning outcomes." While this study includes dynamics related to COVID disruptions, it suggests that learning objectives can be met just as well (if not better) with an online, asynchronous course relative to a blended or in-person course.

Instead of changing the modality, we preferred to clarify the way we will expose students to different disciplinary lenses on sustainability and to modify one element of the course to make that effort more effective (see switch from quiz questions to discussion prompts). Thank you all again for the constructive feedback.

Sincerely,

Jeremy and Brent

References:

- Hrastinski, S. (2008). A study of asynchronous and synchronous e-learning methods discovered that each supports different purposes. *Educause Quarterly*, 4, 51-55.
- Gilbertz, S., Wood, B., Craig, C., Karabas, I., Petrun Sayers, E., & McCormick, B. (2022). Integrating and Evaluating Interdisciplinary Sustainability and STEM Curriculum in Geographical Education: A Case of Three Teaching Modalities. *Journal of Geography*, 121(2), 77-85.

ENR / AEDE 2501

Introduction to Sustainability Fall 2023

Course Information

- **Course times and location:**
 - Lectures: Tuesdays and Thursdays, 12:45 pm – 2:05pm.
 - Laboratory: 2 hours, 1x per week; See section in which you are enrolled for meeting time
- **Credit hours:** 4
- **Mode of delivery:**
 - Lectures: In person
 - Laboratory: In person unless enrolled in an online section (synchronous)

Instructors

- **Name:** Jeremy Brooks
- **Email:** brooks.719@osu.edu
- **Phone Number:** 614-292-9786
- **Office location:** 469D Kottman Hall
- **Office hours:** TBD

- **Name:** Brent Sohngen
- **Email:** sohngen.1@osu.edu
- **Phone Number:** 614-688-4640
- **Office location:** 322 Ag Admin Bldg
- **Office hours:** TBD
- **Preferred means of communication:**
 - Our preferred method of communication for questions is **email**.
 - Our class-wide communications will be sent through the Announcements tool in CarmenCanvas. Please check your [notification preferences](https://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to be sure you receive these messages.

Teaching Assistant

- **Name:** TBD; **Email:** TBD; **Recitation times:** TBD



Course Prerequisites

Sophomore standing, or permission of instructor.

Course Description

Catalog description: Introduces students to principles from various disciplines related to social, economic and environmental sustainability. Students will evaluate key concepts and examine tradeoffs that are a part of sustainability action using case studies representing diverse perspectives.

This course integrates principles from various disciplines that are related to social, economic, and environmental sustainability. Students will evaluate key concepts and examine tradeoffs that are a part of sustainability action using case studies representing sustainability challenges that can be viewed from numerous perspectives. This course is designed to integrate theories, concepts, and approaches from multiple disciplines to expose students to the diversity of ways that sustainability challenges can be conceptualized, framed, and addressed.

Goals

Sustainability requires knowledge of human and natural systems and the skills to manage change and think holistically across scales in time and space. The course reinforces important skills and concepts that are necessary for a fruitful career in sustainability and for critically evaluating key concepts and popular discourse. The primary goals of this course are to (1) develop the foundational knowledge and skills that students will require to grasp the multi-dimensional and multi-disciplinary nature of sustainability (2) examine sustainability concepts and perspectives from different disciplines and (3) discuss the tradeoffs that are often a part of sustainability thinking, planning, and action. Having co-instructors from different disciplinary backgrounds contributes to the first two goals. The course also provides students with a common framework for additional sustainability-oriented courses offered across campus. Students will synthesize some of the fundamental principles, concepts, and knowledge from ecology and environmental science, economics and business, community and international development and sustainability science. Because sustainability can be laden with ideological thinking that can sometimes cloud important issues and avenues for advancement, we will employ a scientific perspective to examine the obstacles and opportunities for social, economic, and environmental sustainability.

OSU's Sustainability Education and Learning Committee identified six dimensions of sustainability to categorize the content of sustainability programs and courses. Each of the four main topic areas for this course addresses each of the six dimensions to different degrees as illustrated by the table below:

Six Dimensions	Human – natural systems	Environmental & earth systems	Economy & governance	Society & culture	Engineering, technology, & design	Health & Well-being
Consumption						
Water						
Climate / Energy						
Biodiversity						

Most emphasis / depth					Least emphasis / depth
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Learning Outcomes

By the end of this course, students should successfully be able to:

- Recall and critically assess various depictions, definitions, and conceptualizations of sustainability, sustainable development, and resilience.
- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Define the concepts of “justice”, “power” and “inequality”, and explain how they shape our understanding of sustainability as well as our understanding of how sustainability efforts can have different impacts on different communities
- Describe how a scientific approach is important to examine the connections, tradeoffs, and synergies across environmental, economic, and social components that are involved in achieving sustainability goals
- Demonstrate an appreciation of how ecosystem function changes in response to human and nonhuman influences, how humans use and impact ecosystem services, and the implications of these human-environment interactions for sustainability
- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability

General Education Expected Learning Outcomes

As part of the **Sustainability Theme** of the General Education curriculum, this course addresses the following goals:

1. Successful students will analyze sustainability at a more advanced and in-depth level than in the Foundations component.
2. Successful students will integrate approaches to sustainability by making connections to out-of- classroom experiences with academic knowledge or across disciplines and/or to work they have done in previous classes and that they anticipate doing in future.

3. Successful students will analyze and explain how social and natural systems function, interact and evolve over time; how human well-being depends on these interactions; how actions have impacts on subsequent generations and societies globally; and how human values, behaviors and institutions impact multifaceted potential solutions across time.

As part of the **Sustainability Theme** of the General Education curriculum, this course is designed to prepare students to:

- 1.1 Engage in critical and logical thinking about the topic or idea of sustainability
- 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of sustainability
 - 2.1 Identify, describe, and synthesize approaches or experience as they apply to sustainability
 - 2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment and creative work, building on prior experiences to respond to new and challenging contexts.
- 3.1 Describe elements of the fundamental dependence of humans on Earth and environmental systems, and on the resilience of those systems
- 3.2 Describe, analyze, and critique the roles and impacts of human activity and technology on both human society and the natural world, in the past, present, and future
- 3.3 Devise informed and meaningful responses to problems and arguments in the area of sustainability based on the interpretation of appropriate evidence and an explicit statement of values

This course fulfills these learning outcomes by requiring students to synthesize material from several disciplines across the natural and social sciences so that they develop a holistic and integrative perspective on sustainability and sustainable development. More specifically, the course integrates perspectives from economics, business, and multiple social science disciplines (e.g., sociology, anthropology, psychology, geography, political science) that contribute to sustainable business practices as well as the research on, and practice of, sustainable community and international development. The course is taught from a systems perspective, encouraging students to examine how ecological systems, social systems, and the economy interact. Assessments include combination of lecture material, class discussions, lab section discussions, exam and quiz questions, class activities, and homework assignments.

How This Course Works

Mode of delivery: We will meet in person for lectures twice a week (Tuesdays and Thursdays) for 80 minutes. In addition, you will attend a two-hour laboratory section once a week. Lab sections will meet in person or online depending on the section in which you enrolled. The online lab section will be synchronous

Co-Teaching: To ensure that students are exposed to the multi-disciplinary nature of sustainability, this course is co-taught by instructors with different disciplinary backgrounds and training. One instructor, affiliated with AEDE, is an Environmental Economist who also has training in business administration and conducts research on forest cover, land use change, and climate change. The other instructor, affiliated with SENR, is a Sustainability Scientist, with a focus on social-ecological systems and an interdisciplinary background that includes a mix of conservation biology and various social science discp, conservation biologists, political scientists, economists, sociologists, and psychologists. The course is designed such that the instructors provide multiple perspectives on each of the core topics covered during the semester. Most importantly, however, both instructors are present for all lectures. While there is a lead instructor for each lecture period, both instructors prompt, and contribute to, class discussions so that students see, in real-time, the variation in how different disciplines may frame, explain, and develop solutions to sustainability challenges. For instance, instructors with different disciplinary backgrounds will have different responses to the following questions that are introduced in class:

- Is there a standard definition of “sustainability” or “sustainable development” in your discipline? If so, what is it?
- How does your discipline view the relationship between consumption, consumerism, and well-being?
- What are the most effective strategies and/or policies for addressing climate change in different contexts?
- Describe the factors that have shaped conflicts and cooperation related to water use and management in different contexts.
- What are the pros and cons of emphasizing technological solutions for addressing water scarcity and climate change as opposed to social, cultural, or behavioral solutions?
- What are the most appropriate tools for understanding how different stakeholders value natural resources and biodiversity conservation?
- Etc...

In addition, the instructors and TAs will rotate through lab sections and will spend the first 15 minutes of each lab section re-capping the previous weeks' topic and sharing a contrasting perspective.

Credit hours and work expectations: This is a 4 credit-hour course. According to [Ohio State bylaws on instruction](https://www.ohio-state.edu/credit-hours/) (go.osu.edu/credit hours), students should expect around 5 hours per week of time spent on direct instruction (instructor content, laboratory exercises, and Carmen activities, for example) in addition to 7-8 hours of homework (reading and assignment preparation, for example) to receive a grade of [C] average.

Attendance and participation requirements: Research shows that regular participation is one of the highest predictors of success. With that in mind, we expect that students will attend lecture and lab sections and regularly contribute to class discussions.

Course Materials, Fees and Technologies

Required Materials and/or Technologies

- There is no required textbook and there are no required technologies beyond those that are necessary for logging into the course website on Carmen

Required Equipment

- **Computer:** current Mac (MacOS) or PC (Windows 10) with high-speed internet connection.
- **Webcam:** built-in or external webcam, fully installed and tested
- **Microphone:** built-in laptop or tablet mic or external microphone
- **Other:** a mobile device (smartphone or tablet) to use for BuckeyePass authentication

If you do not have access to the technology you need to succeed in this class, review options for [technology and internet access](https://go.osu.edu/student-tech-access) (go.osu.edu/student-tech-access).

Required Software

Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365. Visit the [installing Office 365](https://go.osu.edu/office365help) (go.osu.edu/office365help) help article for full instructions.

CarmenCanvas Access

You will need to use [BuckeyePass](https://buckeyepass.osu.edu) (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you do each of the following:

- Register multiple devices in case something happens to your primary device. Visit the [BuckeyePass - Adding a Device](https://go.osu.edu/add-device) (go.osu.edu/add-device) help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes, good for 365 days, that can each be used once.
- [Install the Duo Mobile application](https://go.osu.edu/install-duo) (go.osu.edu/install-duo) on all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at [614-688-4357 \(HELP\)](tel:614-688-4357) and IT support staff will work out a solution with you.

Technology Skills Needed for This Course

- Basic computer and web-browsing skills
- [Navigating CarmenCanvas](https://go.osu.edu/canvasstudent) (go.osu.edu/canvasstudent)



- [CarmenZoom virtual meetings](https://go.osu.edu/zoom-meetings) (go.osu.edu/zoom-meetings)
- [Recording a slide presentation with audio narration and recording, editing and uploading video](https://go.osu.edu/video-assignment-guide) (go.osu.edu/video-assignment-guide)

Technology Support

For help with your password, university email, CarmenCanvas, or any other technology issues, questions or requests, contact the IT Service Desk, which offers 24-hour support, seven days a week.

- **Self Service and Chat:** go.osu.edu/it
- **Phone:** [614-688-4357 \(HELP\)](tel:614-688-4357)
- **Email:** servicedesk@osu.edu



Grading and Faculty Response

How your grade is calculated

Assignment category	Points
Homework 1: “Six words” for sustainability	40
Homework 2: Driving patterns and consumption	40
Homework 3: Klamath basin dams	40
Homework 4: Corporate sustainability	40
Homework 5: GMOs, land use, and biodiversity	40
Homework 6: New ideas for sustainability	40
12 weekly quizzes (5 pts each)	60
Lab section assignments (7 assignments – 10 pts each)	70
Mid-term exam 1	50
Mid-Term exam 2	50
Final Exam	100
Participation in Lab Discussions	100
Total	670

See course schedule, below, for due dates.

Descriptions of Major Course Assignments

WRITTEN HOMEWORK ASSIGNMENTS

Six homework assignments will be provided during the term. These homework assignments focus on developing your critical thinking skills by providing you with an opportunity to apply the material learned in the modules to real world situations. These assignments are a combination of data analysis and written responses to questions/prompts that are provided as part of the assignment materials. See the course website for details and rubrics for each assignment.



Academic integrity and collaboration: Homework assignments are open book but must be completed individually and without the help of other individuals. You are encouraged to ask a trusted person to proofread your assignments before you turn them in but no one else should revise or rewrite your work. Plagiarized work will result in a grade of 0% and may be reported to Ohio State Academic Affairs.

LABORATORY SECTION ASSIGNMENTS

On multiple occasions, written homework assignments will be discussed in lab sections. These assignments are a combination of data analysis and written responses to questions/prompts that are provided as part of the assignment materials. On the weeks when there is no written homework assignment, there will be short assignments (discussion questions, video submissions, etc.) that you will be required to submit at the beginning of lab. These short assignments will be used to demonstrate your understanding of the assigned reading, listening, or viewing materials as well as to initiate discussions and introduce you to the topic of that week's lab. Details for these assignments can be found in the laboratory section schedule below and on the Carmen site for the course.

Academic integrity and collaboration: Your laboratory section assignments should be your own original work. You are encouraged to ask a trusted person to proofread your assignments before you turn them in but no one else should revise or rewrite your work. Plagiarized work will result in a grade of 0% and may be reported to Ohio State Academic Affairs.

PARTICIPATION IN LABORATORY DISCUSSIONS

Most lab sessions will include a discussion based on the written assignments that are submitted for that lab period and/or activities that are conducted in lab on that day. These discussions will be structured around questions/prompts that are provided by the instructors and/or by students. Students will be graded based on the quality and frequency of their participation in both small group and full-class discussions and their ability to demonstrate attributes of critical thinking about the focal topic of the day. In the event that a student has an excused absence during a lab section, they will be permitted to submit written responses to the discussion prompts that were used in class.



WEEKLY QUIZZES

There are 12 timed and graded online quizzes during the term. They are required and will be due by 11:59pm on the Sunday of the week they are assigned. Quiz questions may consist of true/false, multiple choice and short answer questions. All quizzes will be taken online using Carmen and you will have 45 minutes to complete the quizzes. If you do not take the quiz before it closes, you will earn a grade of 0%. Quiz questions will come from lectures, reading material, or other materials (e.g., videos or podcasts) that are assigned for that week.

Academic integrity and collaboration: Each student must complete the quiz on her or his own. You are NOT permitted to receive assistance from anyone else during the quiz. You are NOT permitted to take a quiz as part of a group. You are on your honor to complete the quizzes on your own without help from another person. You ARE permitted to use notes, slides, calculator, textbook, journal articles, books, and Internet during the exam. Additional details will be provided during the semester.

ONLINE EXAMS

There are 3 timed and graded online exams during the term. Examinations may consist of true/false, multiple choice, and short answer questions. All exams will be taken online using **Carmen**. Exams will be open on Carmen for approximately 24 hours and you can take the exam anytime during these 24 hours. You will be given 80 minutes to complete the exam. This is the typical time that would be allowed if the exam were given in a regular classroom setting. If you fail to complete the exam on Carmen before it closes you will earn a grade of 0%. A significant number of exam questions will come from material presented in lectures. Additional material will be drawn from the readings, videos, or other assigned materials. The final exam will be longer and comprehensive. Students will have additional time that matches the length of an in-person final exam period, to complete the final exam. Excuses for missing an exam must be presented to the instructors prior to the exam when at all possible.

Academic integrity and collaboration: Each student must complete the exam on her or his own. You are NOT permitted to receive assistance from anyone else during the exam. You are NOT permitted to take the exams as part of a group. You ARE permitted to use notes, slides, calculator, textbook, journal articles, books, and Internet during the exam. Additional details will be provided during the semester.

There are **NO make-up exams** except for valid reasons (e.g., medical excuse). If you are sick, you must have a note signed by your medical doctor (i.e. a licensed physician) and dated the same day as the exam and excusing you from the 24-hour period that the



exam is open. Otherwise, you will receive a 0 on the exam. The instructor will determine if your excuse is valid. If you do **not** have a reasonable excuse for missing an exam, then you will receive a zero for the exam. Approved make-up exams will consist of multiple choice, short-answer and essay questions.

Late Assignments

Please refer to Carmen for due dates. To receive full credit, work must be turned-in on time and in condition to be evaluated. Late assignments will incur a deduction of 10% of the total point value for each 24-hour period that they are late (including weekends). Late assignments can be turned in for up to 7 days (including weekends) after they are due with the penalty described above. After that, students will receive a 0 for the assignment. Excuses for missed or late assignments – even valid ones – will not be accepted more than 7 days after the assignment due date.

Extenuating circumstances sometimes occur. Students who miss an assignment due to a legitimate reason (e.g., emergency, hospital visit, extended illness) should contact the instructors as soon as possible and provide documentation to request permission to make-up an assignment. Accommodations will be made on a case-by-case basis. If approved, the student will not be penalized for a late submission and the student must make up the missed assignment within a time frame specified by the instructor.

Instructor Feedback and Response Time

I am providing the following list to give you an idea of my intended availability. Remember that you can call [614-688-4357 \(HELP\)](tel:614-688-4357) at any time if you have a technical problem.

- **Preferred contact method:** If you have a question, please contact either of us first through our Ohio State email addresses. One of us will reply to emails within **24 hours on days when class is in session at the university**.
- **Class announcements:** We will send all important class-wide messages through the Announcements tool in CarmenCanvas. Please check [your notification preferences](http://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to ensure you receive these messages.
- **Grading and feedback:** For assignments submitted before the due date, we will try to provide feedback and grades within **seven days**. Assignments submitted after the due date may have reduced feedback and grades may take longer to be posted.

Grading Scale

93–100: A	80–82.9: B-	67–69.9: D+
90–92.9: A-	77–79.9: C+	60–66.9: D
87–89.9: B+	73–76.9: C	Below 60: E
83–86.9: B	70–72.9: C-	



Other Course Policies

Discussion and Communication Guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online. I will provide specific guidance for discussions on controversial or personal topics.
- **Backing up your work:** Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.

Ohio State's Academic Integrity Policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute Academic Misconduct.

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: Any activity that tends to compromise the academic integrity of the University, or subvert the educational process. Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an excuse for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- [Committee on Academic Misconduct](http://go.osu.edu/coam) (go.osu.edu/coam)



- [Ten Suggestions for Preserving Academic Integrity](https://go.osu.edu/ten-suggestions) (go.osu.edu/ten-suggestions)
- [Eight Cardinal Rules of Academic Integrity](https://go.osu.edu/cardinal-rules) (go.osu.edu/cardinal-rules)

Copyright for Instructional Materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

1. Online reporting form at equity.osu.edu,
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or Email equity@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.

Diversity Statement

The Ohio State University affirms the importance and value of diversity of people and ideas. We believe in creating equitable research opportunities for all students and to providing programs and curricula that

allow our students to understand critical societal challenges from diverse perspectives and aspire to use research to promote sustainable solutions for all. We are committed to maintaining an inclusive community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among all members; and encourages each individual to strive to reach their own potential. The Ohio State University does not discriminate on the basis of age, ancestry, color, disability, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, race, religion, sex, gender, sexual orientation, pregnancy, protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment.

To learn more about diversity, equity, and inclusion and for opportunities to get involved, please visit:

- <https://odi.osu.edu/>
- <https://odi.osu.edu/racial-justice-resources>
- <https://odi.osu.edu/focus-on-racial-justice>
- <http://mcc.osu.edu/>

In addition, this course adheres to **The Principles of Community** adopted by the College of Food, Agricultural, and Environmental Sciences. These principles are located on the Carmen site for this course; and can also be found at <https://go.osu.edu/principlesofcommunity>. For additional information on Diversity, Equity, and Inclusion in CFAES, contact the CFAES Office for Diversity, Equity, and Inclusion (<https://equityandinclusion.cfaes.ohio-state.edu/>). If you have been a victim of or a witness to a bias incident, you can report it online and anonymously (if you choose) at <https://equity.osu.edu/>.

Your Mental Health

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 by dialing 988 to reach the Suicide and Crisis Lifeline.

For students in the College of Food, Agricultural, and Environmental Sciences, David Wirt, wirt.9@osu.edu, is the CFAES embedded mental health counselor on the Columbus campus. To contact David, please call 614-292-5766. Students should mention their affiliation with CFAES if interested in speaking directly with David.

Disability Accommodations

The university strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process, managed by Student Life Disability Services. 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.

Disability Services Contact Information

- Phone: [614-292-3307](tel:614-292-3307)
- Website: slds.osu.edu
- Email: slds@osu.edu
- In person: [Baker Hall 098, 113 W. 12th Avenue](#)

Accessibility of Course Technology

This online course requires use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations as early as possible.

- [CarmenCanvas accessibility](http://go.osu.edu/canvas-accessibility) (go.osu.edu/canvas-accessibility)
- Streaming audio and video
- [CarmenZoom accessibility](http://go.osu.edu/zoom-accessibility) (go.osu.edu/zoom-accessibility)

Course Schedule

- Information on assigned readings can be found on the Carmen site in the module for each week. Due dates for all assignments, discussions and quizzes will be clearly indicated on the Carmen site for the class. **Please see the table below this one for additional descriptions of lab activities and assignments.**

LECTURE SCHEDULE

Week	Lectures	Topics and Assigned Reading / Listening / Viewing	Assignments & Quizzes
SECTION I – INTRODUCTION AND BACKGROUND			
1	Lect 1	Class overview and overview of the Anthropocene GE learning objectives 3.1, 3.2	
	Lect 2	What is sustainability? – definitions and perspectives Gallopín, G. C. (2003). <i>A systems approach to sustainability and sustainable development</i> . ECLAC. Robert, K. W., Parris, T. M., & Leiserowitz, A. A. (2005). What is sustainable development? Goals, indicators, values, and practice. <i>Environment: science and policy for sustainable development</i> , 47(3), 8-21. GE learning objectives 1.1, 1.3	Weekly Quiz 1
LAB 1 – Sustainability Graffiti and Introductions			
<i>Students will get to know each other and describe the different ways you think about and prioritize aspects of sustainability and ways of addressing sustainability challenges</i>			
No assigned reading			
GE learning objectives 1.1, 1.2, 2.1, 2.2			
2	Lect 3	What is sustainability? – foundational concepts Mann (2018) Can planet earth feed 10 billion people? The Atlantic. Purvis et al. (2019). Three pillars of sustainability: in search of conceptual origins. <i>Sustainability</i> . 14:681-695	Homework 1: Six words for sustainability GE learning objectives 1.1, 1.2
	Lect 4	Introduction to economic and business concepts	Weekly Quiz 2

		<p>Chapter 1 in Esty, DC and AS Winston. 2006. <i>Green to Gold: How Smart Companies Use Environmental Strategy to Innovate, Create, and Build Competitive Advantage</i>. New York: Wiley</p> <p>Solow, R.M., 1991. Sustainability: an economist's perspective. J Seward Johnson Lecture at Woods Hole Oceanographic Institute. June 14, 1991.</p> <p>Chapter 12 in Langert, B. 2019. <i>The Battle to do Good: Inside McDonald's Sustainability Journey</i>. Emerald Group Publishing.</p> <p>GE learning objectives 1.1, 3.1,</p>	Six words for sustainability comments due
<p>LAB 2 – Six Words for Sustainability</p> <p><i>Students will identify and discuss how they define and conceptualize “sustainability” and the lens through which they examine sustainability challenges and solutions</i></p> <p>See suggested reading for Homework 1</p> <p>GE learning objectives 1.1, 1.2, 2.1, 2.2</p>			
3	Lect 5	<p>Overview of development, poverty, community & inequality</p> <p>Schafer, J., Haslam, P. A., & Beaudet, P. (2009). Meaning, measurement, and morality in international development. <i>Introduction to international development: Approaches, actors, and issues</i>, 2-27.</p> <p>Green, G. P., & Haines, A. (2016). The role of assets in community-based development. <i>Asset Building & Community Development</i>; SAGE Publications, Inc.: New York, NY, USA, 1-31.</p> <p>Hobbes, M. (2014). The problem with international development—and a plan to fix it. <i>New Republic</i>. Available at: http://www.newrepublic.com/article/120178/probleminternational-development-and-plan-fix-it.</p> <p>GE learning objectives 1.1</p>	
<p>SECTION II - CONSUMPTION</p>			
3	Lect 6	<p>Population and consumption</p> <p>Kates, R. W. (2000). Population and consumption: what we know, what we need to know. <i>Environment: Science and Policy for Sustainable Development</i>, 42(3), 10-19.</p> <p>Jahren, H. (2020). Chapter 2: Who we are. <i>The Story of More: How We Got to Climate Change and Where to Go from Here</i>. Hachette UK.</p> <p>GE learning objectives 1.1, 1.2, 2.1</p>	Weekly Quiz 3



LAB 3 – Measuring Progress

Students will compare, and contrast different ways that “progress” has been defined and measured and how this has contributed to current global problems, but may help guide solutions for more sustainable societies

<https://www.youtube.com/watch?v=XAaNaJQVNoY>

<https://www.youtube.com/watch?v=sAtMqwh21Eo>

https://www.youtube.com/watch?v=zhWkTiMVWVI&feature=player_embedded

<https://stories.council.science/stories-human-development/3/>

Papers: Van den Bergh, J. C. (2009). The GDP paradox. *Journal of economic psychology*, 30(2), 117-135.
Costanza, R., Hart, M., Talberth, J., & Posner, S. (2009). Beyond GDP: The need for new measures of progress. *The pardee papers*.

Costanza, R., Kubiszewski, I., Giovannini, E., Lovins, H., McGlade, J., Pickett, K. E., ... & Wilkinson, R. (2014). Development: Time to leave GDP behind. *Nature*, 505(7483), 283-285.

Bleys, B. (2012). Beyond GDP: Classifying alternative measures for progress. *Social indicators research*, 109(3), 355-376.

GE learning objectives 1.1, 1.2, 3.2, 3.3

4	Lect 7	<p>Econ and business perspectives on consumption I</p> <p>Fernholz, K. and Bowyer, J., 2015. The spectrum of forest usage: From livelihood support to large scale commercialization. In <i>Forests, Business and Sustainability</i> (pp. 21-40). Routledge.</p> <p>"Consumption" Britannica Online Eyclopedia</p> <p>Papola, J. "Think Consumption is the Engine of our Economy? Think Again. Forbes. 01/30/2013</p> <p>GE learning objectives 1.1, 1.2, 2.1</p>	
	Lect 8	<p>Econ and Business perspectives on consumption II</p> <p>Nordhaus, W.D., 2000. New directions in national economic accounting. <i>American Economic Review</i>, 90(2), pp.259-263.</p> <p>Pilling, D. Five Ways GDP gets it Totally Wrong as a Measure of Success. World Economic Forum. January 17, 2018.</p> <p>Wikipedia: Green Gross Domestic Product.</p>	Weekly Quiz 4

LAB 4 – Work, Well-Being, and Consumption

Students will discuss the social and economic structures that shape our lives, how those structures impact our consumption patterns, and what this means for our well-being and sustainability in general

Listen to assigned Ezra Klein podcast with James Suzman:

<https://www.nytimes.com/2021/06/29/opinion/ezra-klein-podcast-james-suzman.html>

Watch the 21 hours video by NEF: <https://www.youtube.com/watch?v=580VyI6hFmo>

GE learning objectives 1.1, 1.2, 2.1, 2.2, 3.3

5	Lect 9	<p>Social, psychological, and anthropological perspectives on why we consume</p> <p>Wilk (2002) Consumption, human needs, and global environmental change." <i>Global environmental change</i> 12 (1): 5-13.</p> <p>GE learning objectives 2.1, 2.2, 3.2</p>	<p>Homework 2: Driving patterns and consumption</p> <p>GE learning objectives 2.1, 3.2, 3.3</p>
	Lect 10	<p>How can we consume more sustainably I?</p> <p>Parrique, T., Barth, J., Briens, F., Kuokkanen, A., & Spangenberg, J. H. (2019). Evidence and arguments against green growth as a sole strategy for sustainability. <i>European Environmental Bureau</i>.</p> <p>Howarth, R. B. (2012). Sustainability, well-being, and economic growth. <i>Minding Nature</i>, 5(2), 32-39.</p> <p>Frank (2020): Spend more on society and get more for yourself. NY Times.</p> <p>GE learning objectives 2.1, 2.2, 3.2,</p>	Weekly Quiz 5
<p>LAB 5 – Systems thinking and Sustainable transportation</p> <p><i>Students will discuss multiple ways of fostering more sustainable forms of transportation and the systems, structures, and social, cultural, and economic tradeoffs that are associated with these solutions</i></p> <p>https://mahb.stanford.edu/blog/systems-thinking-can-help-build-sustainable-world-beginning-conversation/</p> <p>Smith, T. (2011). Using critical systems thinking to foster an integrated approach to sustainability: A proposal for development practitioners. <i>Environment, development and sustainability</i>, 13(1), 1-17.</p> <p>GE learning objectives 1.1, 1.2, 2.1, 2.2, 3.2, 3.3</p>			
6	Lect 11	<p>How can we consume more sustainably II?</p> <p>GE learning objectives 2.1, 2.2, 3.2,</p>	
<p>SECTION III - WATER</p>			
6	Lect 12	<p>Sustainability and Water</p> <p>Braden, J.B. and Shortle, J.S., 2013. Agricultural sources of water pollution. In <i>Encyclopedia of Energy, Natural Resource and Environmental Economics</i>. (pp. 81-85). Elsevier.</p> <p>Earnhart, D., 2013. Water pollution from industrial sources. In <i>Encyclopedia of Energy, Natural Resource and Environmental Economics</i>. (pp. 114-120) Elsevier</p> <p>Anderson, T.L., Scarborough, B. and Watson, L.R., 2013. Water crises, water rights, and water markets. In <i>Encyclopedia of</i></p>	Weekly Quiz 6

		<p><i>Energy, Natural Resource and Environmental Economics.</i> (pp. 248-254) Elsevier Inc.</p> <p>GE learning objectives 1.1, 1.2, 3.1</p>	
<p>LAB 6 – Economic Valuation and Natural Capital</p> <p><i>Students will use data to value natural capital on campus and evaluate tradeoffs between different policy scenarios related to infrastructure change</i></p> <p>Read report on Economic Value of Natural Areas in Ohio and view the YouTube video "How are countries Doing Natural Capital Accounting?"</p> <p>https://aede.osu.edu/https%3A/aede.osu.edu/faculty-outreach/economic-value-natural-areas-ohio</p> <p>https://www.youtube.com/watch?v=sg-xu31Emws</p> <p>GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3</p>			
7	Lect 13	<p>The economics of water quality and quantity</p> <p>Same readings as Lecture 12.</p> <p>GE learning objectives 1.1, 1.2, 3.1</p>	<p>Midterm Exam 1</p> <p>GE learning objectives 1.1, 1.2</p>
	Lect 14	<p>Water and community development</p> <p>Doremus, H., & Tarlock, A. D. (2003). Fish, farms, and the clash of cultures in the Klamath basin. <i>Ecology LQ</i>, 30, 279.</p> <p>GE learning objectives 1.1, 1.2, 2.1, 3.1</p>	Weekly Quiz 7
<p>LAB 7 – Tradeoffs and Ecosystem Services</p> <p><i>Students will use multi-attribute utility theory to explore tradeoffs and describe how this tool can facilitate collective decision-making. Students will see how different stakeholders use and value water</i></p> <p>McGraw-Hill Environmental Case Study: "Sharing the Klamath"</p> <p>Section 1.3 on pages 1-61 to 1-68, including table 1.3-1, of US Department of Interior, Bureau of Reclamation. 2012. Benefit Cost and Regional Economic Development. Technical Report for the Secretarial Determination on Whether to Remove Four Dams on the Klamath River in California and Oregon</p> <p>News article from the High Country News (Aug, 27, 2021): Klamath River issues explained. https://www.hcn.org/articles/klamath-basin-confused-about-whats-happening-on-the-klamath-heres-a-rundown/print_view</p> <p>News article from Sacramento News and Review (June, 29, 2021): https://sacramento.newsreview.com/2021/06/29/hopes-for-imperiled-fish-rise-as-ferc-approves-transfer-of-klamath-river-dam-license/</p>			



GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3			
8	Lect 15	Water and international development GE learning objectives 1.1, 1.2, 3.1	Homework 3: Klamath Dams GE learning objectives 2.1, 2.2, 3.2, 3.3
FALL BREAK			
9	Lect 16	Business and Water Sommer, A. and B. Sohngen. 2002. "Pricing the Environment: An Introduction." OSU Extension Fact Sheet. Loomis, J. 1997. "Use of Non-Market Valuation Studies in Water Resources Management Assessments." Water Resources Update, Universities Council on Water Resources. Issue No. 109: Autumn 1997 Boccaletti, G, M Grobbel, and MR Stuchtey. 2009. The Business Opportunity in Water Conservation. McKinsey Quarterly. December 1, 2009.	
LAB 8 – Life-cycle assessment			
<i>Students will conduct a life-cycle assessment to explore the impacts of different products as well as how such assessments can impact consumption decision, supply chain decisions, and policies</i>			
Chapters 1 and 2 in Shaked, S., Crettaz, P., Saade-Sbeih, M., Jolliet, O. and Jolliet, A., 2015. <i>Environmental life cycle assessment</i> . CRC Press. (Pp. 1-21)			
Hoogmartens, R., Van Passel, S., Van Acker, K. and Dubois, M., 2014. Bridging the gap between LCA, LCC and CBA as sustainability assessment tools. <i>Environmental Impact Assessment Review</i> , 48, pp.27-33.			
GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3			
SECTION IV – CLIMATE & ENERGY			
	Lect 17	Introduction to Climate/Energy IPCC Working Group I. 2021. The Physical Science Basis. Summary for Policymakers. BP. 2021. Energy Outlook. Pages 0-31:	Weekly Quiz 8



		<p>Nordhaus, William (2017): Integrated assessment models of climate change, NBER Reporter, National Bureau of Economic Research (NBER), Cambridge, MA, Iss. 3, pp. 16-20</p> <p>View this video on discounting (7:46)</p> <p>https://www.youtube.com/watch?v=Mol1yT7tczY</p> <p>GE learning objectives 1.1, 1.2, 3.1, 3.2</p>	
<p>LAB 9 – Metrics for corporate sustainability</p> <p><i>Students will critically evaluate corporate sustainability metrics and how they have evolved, describe recent improvements in sustainability accounting, and discuss what gaps remain</i></p> <p>Bernow, S., J. Godsall, B. Klempner, and C. Merten. 2019. More than values: The value-based sustainability reporting that investors want. McKinsey and Company. https://www.mckinsey.com/business-functions/sustainability/our-insights/more-than-values-the-value-based-sustainability-reporting-that-investors-want</p> <p>2020 Business and ESG Report for The Coca-Cola Company. https://d1io3yog0oux5.cloudfront.net/cocacolacompany/files/pages/cocacolacompany/db/761/description/coca-cola-business-environmental-social-governance-report-2020+%282%29.pdf</p> <p>GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3</p>			
10	Lect 18	<p>Climate/Energy - economics and business</p> <p>Same as above</p> <p>GE learning objectives 1.1, 1.2, 3.1, 3.2</p>	
	Lect 19	<p>Climate/Energy - economics and business</p> <p>Same as above.</p> <p>GE learning objectives 1.1, 1.2, 3.1, 3.2</p>	<p>Weekly Quiz 9</p> <p>Homework 4: Corporate sustainability</p> <p>GE learning objectives 1.1, 1.2, 2.2, 3.2, 3.3</p>
<p>LAB 10 – Indigenous rights, climate change, and REDD+</p> <p><i>Students will examine the governance challenges that accompany large-scale programs that address global climate change and describe the importance of property rights, land tenure, and land security</i></p> <p>Barbier, E. B., & Tesfaw, A. T. (2012). Can REDD+ save the forest? The role of payments and tenure. <i>Forests</i>, 3(4), 881-895.</p> <p>Newton, P., Oldekop, J. A., Brodnig, G., Karna, B. K., & Agrawal, A. (2016). Carbon, biodiversity, and livelihoods in forest commons: synergies, trade-offs, and implications for REDD+. <i>Environmental Research Letters</i>, 11(4), 044017.</p>			



<p>Andersson, K. P., Smith, S. M., Alston, L. J., Duchelle, A. E., Mwangi, E., Larson, A. M., ... & Wong, G. Y. (2018). Wealth and the distribution of benefits from tropical forests: Implications for REDD+. <i>Land use policy</i>, 72, 510-522.</p> <p>GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3</p>			
11	Lect 20	<p>Climate/Energy and international development</p> <p>Larson, A. M., Brockhaus, M., Sunderlin, W. D., Duchelle, A., Babon, A., Dokken, T., ... & Huynh, T. B. (2013). Land tenure and REDD+: The good, the bad and the ugly. <i>Global environmental change</i>, 23(3), 678-689.</p> <p>https://www.youtube.com/watch?v=4Z4TIC1ObUI</p> <p>https://www.youtube.com/watch?v=FPFPUhsWMaQ</p> <p>GE learning objectives 1.1, 1.2, 3.1, 3.2</p>	
	Lect 21	<p>Climate/energy and communities</p> <p>Leyden, K. M. (2003). Social capital and the built environment: the importance of walkable neighborhoods. <i>American journal of public health</i>, 93(9), 1546-1551.</p> <p>Anguelovski, I., Connolly, J. J., Pearsall, H., Shokry, G., Checker, M., Maantay, J., ... & Roberts, J. T. (2019). Opinion: Why green “climate gentrification” threatens poor and vulnerable populations. <i>Proceedings of the National Academy of Sciences</i>, 116(52), 26139-26143.</p> <p>Mock, B. (2019). Why Detroit residents pushed back against tree-planting. <i>Bloomberg CityLab</i>, 11.</p> <p>GE learning objectives 1.1, 1.2, 3.1, 3.2</p>	Weekly Quiz 10
<p>LAB 11 – Critical perspectives on technology for sustainability</p> <p><i>Students will think critically about the role of technology in addressing sustainability challenges and evaluate the pros and cons of technology and the social and cultural implications of technological change</i></p> <p>Listen to Ezra Klein Podcast with L.M. Sacasas on the 41 Questions we should ask of the technologies and tools that shape our lives.</p> <p>https://www.nytimes.com/2021/08/03/opinion/ezra-klein-podcast-lm-sacasas.html</p> <p>GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3</p>			
<p>SECTION V – BIODIVERSITY</p>			
12	Lect 22	<p>Trends in biodiversity</p> <p>https://f.hubspotusercontent20.net/hubfs/4783129/LPR/PDFs/ENGLISH-FULL.pdf</p>	Midterm Exam 2



		GE learning objectives 1.1, 1.2, 3.1, 3.2	GE learning objectives 1.1, 1.2
		VETERAN'S DAY	
LAB 12 – Community-based conservation <i>After seeing community-based conservation and action, students will discuss the tension between biodiversity conservation and economic development, how the design, and impacts, of conservation programs are shaped by gender, and cultural variation in perspectives on wildlife and the environment</i> Watch the documentary “Milking the Rhino” (available through university libraries) GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3			
13	Lect 23	Biodiversity and sustainable development Adams, W. M., Aveling, R., Brockington, D., Dickson, B., Elliott, J., Hutton, J., ... & Wolmer, W. (2004). Biodiversity conservation and the eradication of poverty. <i>science</i> , 306(5699), 1146-1149. Gavin et al. (2018) Effective Biodiversity Conservation Requires Dynamic, Pluralistic, Partnership-Based Approaches. <i>Sustainability</i> . 10: 1845 – 1856 GE learning objectives 1.1, 1.2, 3.1, 3.2	Homework 5: New ideas for sustainability <i>(can be submitted at any time before this date)</i>
	Lect 24	Communities and Conservation Roe, D. (2008). The origins and evolution of the conservation-poverty debate: a review of key literature, events, and policy processes. <i>Oryx</i> , 42(4), 491-503. GE learning objectives 1.1, 1.2, 3.1, 3.2	Weekly Quiz 11
LAB 13 – Agriculture, biodiversity, and GMOs <i>Students will examine how different stakeholders, at different scales of governance and decision-making, view the relationships - and weigh potential tradeoffs - between agricultural productivity and biodiversity in the context of GMOs</i> Case Study for Chapter 14 in Duncan, Jancar-Webster, and Switky. 2009. World Politics in the 21 st Century. Student Choice Edition. New York: Houghton Mifflin. http://college.cengage.com/polisci/duncan/world_politics_sce/1e/assets/students/case/duncan_1e_case_ch14.pdf Lappe, Anna. 2011. The Battle for Biodiversity: Monsanto and Farmers Clash. The Atlantic. March 28 2011. http://www.theatlantic.com/health/archive/2011/03/the-battle-for-biodiversity-monsanto-and-farmers-clash/73117/ Aldhous, P. 2008. Genes for Greens. New Scientist. January 5, 2008 https://www.newscientist.com/article/mg19726372-900-could-new-gm-crops-please-the-greens/			



<p>Hamblin, J. 2016. The Fading meaning of GMO. The Atlantic. https://www.theatlantic.com/science/archive/2016/05/plants-for-the-planet/483132/</p> <p>Regis, E. 2019. "The True Story of the Genetically Modified Superfood that Almost Saved Millions" Foreign Policy. October 17, 2019. https://foreignpolicy.com/2019/10/17/golden-rice-genetically-modified-superfood-almost-saved-millions/#</p> <p>Regis, E. 2019. "Golden rice could save children. Until now, governments have barred it." Washington Post. November 11, 2019. https://www.washingtonpost.com/opinions/2019/11/11/golden-rice-long-an-anti-gmo-target-may-finally-get-chance-help-children/</p> <p>GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3</p>			
14	Lect 25	<p>Biodiversity and community development</p> <p>Brooks, J., Waylen, K. A., & Mulder, M. B. (2013). Assessing community-based conservation projects: A systematic review and multilevel analysis of attitudinal, behavioral, ecological, and economic outcomes. <i>Environmental Evidence</i>, 2(1), 1-34.</p> <p>GE learning objectives 1.1, 1.2, 3.1, 3.2</p>	
THANKSGIVING			
15	Lect 26	<p>Biodiversity and economics</p> <p>Pearce, Fred. 2020. Parks vs. People: In Guatemala, Communities Take Best Care of the Forest. YaleEnvironment360: https://e360.yale.edu/features/parks-vs-people-in-guatemala-communities-take-best-care-of-the-forest (Links to an external site.)</p> <p>Radwin, Max. 2019. Fire, cattle, cocaine: Deforestation spikes in Guatemalan national park. Mongabay. https://news.mongabay.com/2019/06/invaders-cattle-cocaine-deforestation-spikes-in-guatemalan-national-park/ (Links to an external site.)</p> <p>Fortmann, L et al., 2017. Assessing the role of group heterogeneity in community forest concessions in Guatemala's Maya Biosphere Reserve. <i>Land Economics</i>. 93(3), pp.503-526. Download Fortmann, L et al., 2017. Assessing the role of group heterogeneity in community forest concessions in Guatemala's Maya Biosphere Reserve. <i>Land Economics</i>. 93(3), pp.503-526.</p> <p>Mukpo, Ashoka. 2021. The Brooklyn Bridge needs a makeover. Is rainforest lumber still in style? Mongabay. https://news.mongabay.com/2021/07/the-brooklyn-bridge-needs-a-makeover-but-is-rainforest-lumber-still-in-style/ (Links to an external site.)</p> <p>GE learning objectives 1.1, 1.2, 3.1, 3.2</p>	



	Lect 27	Biodiversity and economics Same readings	Weekly Quiz 12 Homework 6: GMOs and Biodiversity GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3
LAB 14 – Revisiting our six words for sustainability			
<i>Students will reflect on how their understandings, definitions, and conceptualizations of sustainability have changed throughout the semester</i>			
Re-read your original Six Words post and justification			
GE learning objectives 1.1, 2.2, 3.3			
16	Lect 28	Synthesis and integration – returning to the pillars of sustainability	
	Dec 14th	FINAL EXAM: 2:00 – 3:45 pm	

LAB SECTION SCHEDULE

The laboratory component of this course is equivalent to 1-credit-hour. According to [Ohio State policy](#), students should expect to spend 2 hours per week in this laboratory. A student's 2-hour-work week includes direct instruction, taking notes, studying, readings, assignments, group work and completing labs. **Please note that the instructors will rotate among lab sections so you will have a different instructor, and gain a different point of view, each week.**

For students in the online, synchronous lab section: The activities and discussions outlined below will take place individually and in online discussion groups. Peer groups for online discussions will be created by using the Carmen Learning Management System to randomly divide enrolled students into groups of 4-5. Students maintain group membership throughout the semester, which helps to form community within the course.

Items labeled as "Class discussions" in the lab section descriptions below will function as a common discussion for all students in the online section. For items labeled as "Small groups", students in the online section will work with their online peer groups. **See the main course calendar above for indicators of which Sustainability GE Learning objectives are addressed in each lab.**

Laboratory Topics, Activities, and Assessments

LAB 1 – Sustainability Graffiti and Introductions

Preparation: No assigned materials

Exercise: Introductions and Sustainability Graffiti.

Class discussion - Students introduce themselves and discuss their backgrounds, interests, and perspectives on sustainability. Students then walk around the room and write responses to a set of up to 15 posted prompts.

Small groups will be assigned a prompt and must summarize and comment on the responses to that prompt. These summaries will be shared with the class.

Evaluation: Participation in discussion

Learning Outcomes Met:

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others

LAB 2 – Six Words for Sustainability

Preparation: We want to hear what you think about sustainability before we get too far along in the course, so just clear your mind, and **Submit homework #1**

Exercise: Class Discussion of 6 six words assignment submissions. Students will present their six words and read their justification for the phrase they chose. As a class, students will compare, contrast and categorize the phrases – including a set of past student submissions - creating a conceptual map of the different perspectives on sustainability that have emerged.

Small groups of students will then link the phrases to the definitions, depictions and conceptualizations of sustainability that were introduced in lecture as well as the foundational pillars for the class.

Evaluation: Participation in discussion

Learning Outcomes Met:

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.

- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others
- Recall and critically assess various depictions, definitions, and conceptualizations of sustainability, sustainable development, and resilience.

LAB 3 – Measuring Progress

Preparation: Watch short video on Gross National Happiness in Bhutan (examples are linked below), re-read articles on alternative measures of GDP and submit a 1-minute video of critiques of GDP based on their own internet research.

<https://www.youtube.com/watch?v=XAaNaJQVNoY>

<https://www.youtube.com/watch?v=sAtMqwh21Eo>

https://www.youtube.com/watch?v=zhWkTiMVWVI&feature=player_embedded

<https://stories.council.science/stories-human-development/3/>

Papers: Van den Bergh, J. C. (2009). The GDP paradox. *Journal of economic psychology*, 30(2), 117-135.
Costanza, R., Hart, M., Talberth, J., & Posner, S. (2009). Beyond GDP: The need for new measures of progress. *The pardee papers*.

Costanza, R., Kubiszewski, I., Giovannini, E., Lovins, H., McGlade, J., Pickett, K. E., ... & Wilkinson, R. (2014). Development: Time to leave GDP behind. *Nature*, 505(7483), 283-285.

Bleys, B. (2012). Beyond GDP: Classifying alternative measures for progress. *Social indicators research*, 109(3), 355-376.

Exercise: Small groups of students will use longitudinal datasets provided by the instructors to compare and contrast GDP with alternative measures of development (where alternative measures (Human Development Index, Social Progress Index, Happy Planet Index, Gross National Happiness Index, etc.). Based on their exploration of the data, **small groups** must develop a list of pros and cons of using alternative measures as well as a summary of whether and how policy decisions would be different if based on these alternative measures.

Evaluation: Lab assignment 1 (1 min video) and participation

Learning Outcomes Met:

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales

- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability

LAB 4 – Work, Well-Being, and Consumption

Preparation: Listen to assigned Ezra Klein podcast with James Suzman:

<https://www.nytimes.com/2021/06/29/opinion/ezra-klein-podcast-james-suzman.html>

Watch the 21 hours video by NEF: <https://www.youtube.com/watch?v=580Vyl6hFmo>

After listening to, and viewing, the assigned podcast and video, individual students must submit three points of agreement and three points with which they disagree. Students must also submit three discussion questions.

Exercise: Based on materials submitted by the students, students will start in **small groups** discussing perspectives on work and employment in our society and the relationship between work, consumption and sustainability. Student groups will link their arguments to the 12 foundational pillars for the course paying special attention to *time, systems thinking, tradeoffs, the business drivers of sustainability, externalities, individual vs structural change, governance, power and inequality, and social dilemmas*. Student groups will discuss the implications of changes to normal work structures in our society.

Class discussion: Each group will summarize and present their discussion, which will precipitate a full class discussion

Evaluation: Lab assignment 2 (discussion questions) and participation in discussion

Learning Outcomes Met:

- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability

LAB 5 – Systems thinking and Sustainable transportation

Preparation: Read the following

<https://mahb.stanford.edu/blog/systems-thinking-can-help-build-sustainable-world-beginning-conversation/>

Smith, T. (2011). Using critical systems thinking to foster an integrated approach to sustainability: A proposal for development practitioners. *Environment, development and sustainability*, 13(1), 1-17.

and **Submit homework #2** on CO2 emissions related transportation and driving behavior



Exercise: Small groups of students will discuss and critically evaluate responses to homework and link responses to the 12 foundational pillars for the course, paying special attention to *systems thinking, technology and efficiency vs behavioral change, externalities, time, tradeoffs, and individual vs structural change, and governance, power and inequality*. Small groups must then pick one of three modes of transportation for which they use data to calculate CO2 emissions for Ohio residents and outline the tradeoffs associated with increasing the use of those modes of transportation: (i) electric vehicles, (ii) airplanes, (iii) rail (light and long-distance)

Evaluation: Participation in discussion

Learning Outcomes Met:

- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Describe how a scientific approach is important to examine the connections, tradeoffs, and synergies across environmental, economic, and social components that are involved in achieving sustainability goals
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales

LAB 6 – Economic Valuation and Natural Capital

Preparation: Read report on Economic Value of Natural Areas in Ohio and view the YouTube video "How are countries Doing Natural Capital Accounting?"

<https://aede.osu.edu/https%3A/aede.osu.edu/faculty-outreach/economic-value-natural-areas-ohio>

<https://www.youtube.com/watch?v=sg-xu31Emws>

Exercise: During the lab, individual students will use the data provided in Carmen to value natural capital on campus (e.g., the Olentangy river corridor, grassed common areas, trees, retention ponds and water courses). The lab will include instructions on how to use a worksheet to value natural capital. In addition to valuing natural capital, students will be asked to consider a set of policy scenarios that change infrastructure on campus. They will be asked to evaluate the tradeoffs associated with the policy scenarios in terms of key university outputs (e.g., improvements to educational opportunities), environmental outputs as measured by natural capital, and social and equity outputs. Students will present the results of their analysis to the whole lab section and discuss the results.



Evaluation: Lab assignment 3 (written answers submitted at the end of the section) and participation in discussion

Learning Outcomes Met:

- Describe a how a scientific approach is important for examining the connections, tradeoffs, and synergies across environmental, economic, and social components that are involved in achieving sustainability goals
- Demonstrate an appreciation of how ecosystem function changes in response to human and nonhuman influences, how humans use and impact ecosystem services, and the implications of these human-environment interactions for sustainability
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales

LAB 7 – Tradeoffs and Ecosystem Services

Preparation:

Read the following

McGraw-Hill Environmental Case Study: “Sharing the Klamath”

Section 1.3 on pages 1-61 to 1-68, including table 1.3-1 of US Department of Interior, Bureau of Reclamation. 2012. Benefit Cost and Regional Economic Development. Technical Report for the Secretarial Determination on Whether to Remove Four Dams on the Klamath River in California and Oregon

News article from the High Country News (Aug, 27, 2021): Klamath River issues explained. https://www.hcn.org/articles/klamath-basin-confused-about-whats-happening-on-the-klamath-heres-a-rundown/print_view

News article from Sacramento News and Review (June, 29, 2021): <https://sacramento.newsreview.com/2021/06/29/hopes-for-imperiled-fish-rise-as-ferc-approves-transfer-of-klamath-river-dam-license/>

Submit homework #3 on tradeoffs over ecosystem services in the Klamath Basin.

Exercise: The homework will prepare students for the multi-attribute utility theory (MAUT) exercise that we will conduct during the laboratory session. The objective of the exercise is to show students how MAUT can be used effectively to identify opportunities for improved social outcomes when difficult and contentious tradeoffs exist between groups. We will focus on surface water allocation and removal of four dams in the upper part of the basin. Students were assigned a specific role when they did their homework (farmer, sport angler, commercial fishery, Native American in tribe with historical rights, and Audubon society member from Portland, Oregon), and they will work with other students in their role. Students will answer a series of questions about their objectives, their views on the outcomes associated with removing the dams, and how they rank the outcomes. The instructor will use the resulting information to quantify a preferred outcome or set of preferred outcomes based on the results. Students will then discuss, as a class, and critically evaluate



whether dams should be removed based on this assessment. The final discussion will include additional review of other approaches to collaborative decision-making.

Evaluation: Participation in lab work and discussion

Learning Outcomes Met:

- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability

LAB 8 – Life-cycle assessment

Preparation: Read the following

Chapters 1 and 2 in Shaked, S., Crettaz, P., Saade-Sbeih, M., Jolliet, O. and Jolliet, A., 2015. *Environmental life cycle assessment*. CRC Press. (Pp. 1-21)

Hoogmartens, R., Van Passel, S., Van Acker, K. and Dubois, M., 2014. Bridging the gap between LCA, LCC and CBA as sustainability assessment tools. *Environmental Impact Assessment Review*, 48, pp.27-33.

Exercise: Students will be assigned one of three products (ethanol, cardboard boxes, red meat) and spend the first part of the lab researching the product on the internet to find information on the life-cycle effects on carbon-equivalent emissions. Students will then team up with other students who assessed the same product and discuss about how life-cycle analysis can be used to influence consumption decisions, supply chain decisions, or policies that society adopts. Each group will present the results of their analysis and discussion to the rest of the group.

Evaluation: Lab assignment 4 (life cycle analysis submission) and participation in discussion.

Learning Outcomes Met:

- Recall and critically assess various depictions, definitions, and conceptualizations of sustainability, sustainable development, and resilience.
- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level

LAB 9 – Metrics for corporate sustainability



Preparation:

Read

Bernow, S., J. Godsall, B. Klempner, and C. Merten. 2019. More than values: The value-based sustainability reporting that investors want. McKinsey and Company. <https://www.mckinsey.com/business-functions/sustainability/our-insights/more-than-values-the-value-based-sustainability-reporting-that-investors-want>

2020 Business and ESG Report for The Coca-Cola Company.

<https://d1io3yog0oux5.cloudfront.net/cocacolacompany/files/pages/cocacolacompany/db/761/description/coca-cola-business-environmental-social-governance-report-2020+%282%29.pdf>

Submit homework #4 on the Coca-Cola company corporate sustainability report (note that the specific company report will be rotated from year to year).

Exercise: In lab, students will evaluate the sustainability criteria/metrics that Coca-Cola reported and used. **Student groups** will work with each other to answer a series of questions about various outcomes in the report. The questions will ask students to report back on several pros and cons associated with each outcome or measurement. We will select a range sustainability goals, i.e., those that address equity and inclusion as well as environmental stewardship and students will be required to address pros and cons of each of them. Each group will then report out to the whole group for broader discussion.

Evaluation: Participation in discussion

Learning Outcomes Met:

- Recall and critically assess various depictions, definitions, and conceptualizations of sustainability, sustainable development, and resilience.
- Describe how a scientific approach is important to examine the connections, tradeoffs, and synergies across environmental, economic, and social components that are involved in achieving sustainability goals
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level

LAB 10 – Indigenous rights, climate change, and REDD+

Preparation: Read assigned articles, which supplement the reading and videos for lecture.

Referring to these papers as well as lecture material on payments for ecosystem services, create a list of three pros and three cons of using REDD+ as a tool for carbon sequestration as well as three discussion questions.

Barbier, E. B., & Tesfaw, A. T. (2012). Can REDD+ save the forest? The role of payments and tenure. *Forests*, 3(4), 881-895.

Newton, P., Oldekop, J. A., Brodnig, G., Karna, B. K., & Agrawal, A. (2016). Carbon, biodiversity, and livelihoods in forest commons: synergies, trade-offs, and implications for REDD+. *Environmental Research Letters*, 11(4), 044017.



Andersson, K. P., Smith, S. M., Alston, L. J., Duchelle, A. E., Mwangi, E., Larson, A. M., ... & Wong, G. Y. (2018). Wealth and the distribution of benefits from tropical forests: Implications for REDD+. *Land use policy*, 72, 510-522.

Exercise: Based on the assigned materials and written submissions, **small groups** will discuss the pros and cons of REDD+ and link this approach with the 12 foundational pillars for the class, playing special attention to *governance, power and inequality, systems thinking, and tradeoffs*. **Student groups** will then use data to calculate the impact on CO₂ levels and future climate change for one of three proposed strategies: (i) carbon sequestration through large-scale afforestation and forest management efforts (like REDD+), (ii) solar geoengineering, and (iii) technologically based carbon capture and sequestration. Each group will present their calculations and the class will discuss each approach.

Evaluation: Lab assignment 5 (pros and cons list and discussion questions) and participation in discussion

Learning Outcomes Met:

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Describe how a scientific approach is important to examine the connections, tradeoffs, and synergies across environmental, economic, and social components that are involved in achieving sustainability goals
- Demonstrate an appreciation of how ecosystem function changes in response to human and nonhuman influences, how humans use and impact ecosystem services, and the implications of these human-environment interactions for sustainability
- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales

LAB 11 – Critical perspectives on technology for sustainability

Preparation: Submit homework #5 on sustainability innovations. Listen to Ezra Klein Podcast with L.M. Sacasas on the 41 Questions we should ask of the technologies and tools that shape our lives.

<https://www.nytimes.com/2021/08/03/opinion/ezra-klein-podcast-lm-sacasas.html>

Exercise: Each student presents their innovation and associated write-up – students in the online section will submit 2–3-minute videos on Carmen. The class will discuss each innovation that has

been presented in light of the information provided in the podcast above as well as the foundational pillars from class. The class will also critically analyze innovations that have been submitted by previous classes

Evaluation: Homework submission and participation

Learning Outcomes Met:

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Describe how a scientific approach is important to examine the connections, tradeoffs, and synergies across environmental, economic, and social components that are involved in achieving sustainability goals
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales

LAB 12 – Community-based conservation

Preparation: Watch the documentary “Milking the Rhino” (available through university libraries) and write 3 discussion questions.

Exercise: As individuals, students will respond to a set of discussion questions about the film, including ones submitted by their classmates. **Small groups** will then discuss their responses and critically evaluate community-based conservation and eco-tourism as strategies for biodiversity conservation. Groups will be asked to pay special attention to differences in cultural perspectives on wildlife, cross-cultural tensions created by eco-tourism, gender differences in community-level governance and the long-term effects of development. Students will also be asked to think these strategies to the 12 foundational pillars for the course, with a focus on *social dilemmas, systems thinking, tradeoffs, and governance, power and inequality*

Evaluation: Lab assignment 6 (written discussion questions) and participation in discussion

Learning Outcomes Met:

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Demonstrate an appreciation of how ecosystem function changes in response to human and nonhuman influences, how humans use and impact ecosystem services, and the implications of these human-environment interactions for sustainability
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales



LAB 13 – Agriculture, biodiversity, and GMOs

Preparation:

Read

Case Study for Chapter 14 in Duncan, Jancar-Webster, and Switky. 2009. World Politics in the 21st Century. Student Choice Edition. New York: Houghton Mifflin.

http://college.cengage.com/polisci/duncan/world_politics_sce/1e/assets/students/case/duncan_1e_case_ch14.pdf

Lappe, Anna. 2011. The Battle for Biodiversity: Monsanto and Farmers Clash. The Atlantic. March 28 2011. <http://www.theatlantic.com/health/archive/2011/03/the-battle-for-biodiversity-monsanto-and-farmers-clash/73117/>

Aldhous, P. 2008. Genes for Greens. New Scientist. January 5, 2008 <https://www.newscientist.com/article/mg19726372-900-could-new-gm-crops-please-the-greens/>

Hamblin, J. 2016. The Fading meaning of GMO. The Atlantic. <https://www.theatlantic.com/science/archive/2016/05/plants-for-the-planet/483132/>

Regis, E. 2019. "The True Story of the Genetically Modified Superfood that Almost Saved Millions" Foreign Policy. October 17, 2019. <https://foreignpolicy.com/2019/10/17/golden-rice-genetically-modified-superfood-almost-saved-millions/#>

Regis, E. 2019. "Golden rice could save children. Until now, governments have barred it." Washington Post. November 11, 2019. <https://www.washingtonpost.com/opinions/2019/11/11/golden-rice-long-an-anti-gmo-target-may-finally-get-chance-help-children/>

Submit homework #6 GMOs, agriculture and biodiversity and re-read assigned articles for homework #6

Exercise: In the laboratory section, students are placed into groups with a mix of stakeholder perspectives. The stakeholder perspectives were assigned for the homework assignment, and students answered questions on the homework from the perspective of the specific stakeholder. Each group will then be assigned as an organization (and NGO, a government regulatory agency, or a company), and each group will have to devise a 25–100-word maximum policy statement about the use of GMOs on Bangladesh rice farms. Each stakeholder must agree with the policy statement. The groups will present their policy statements and defend them.

Evaluation: Homework submission and participation in discussion

Learning Outcomes Met:

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Demonstrate an appreciation of how ecosystem function changes in response to human and nonhuman influences, how humans use and impact ecosystem services, and the implications of these human-environment interactions for sustainability



- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others

LAB 14 – Revisiting our six words for sustainability

Preparation: No assigned materials

Exercise: Students will come to class with their original six words for sustainability assignment submission. Students will determine whether they still agree with their original six-word phrase. Students will have the opportunity to craft a new phrase based on what they have learned throughout the course. In addition, they will write an explanation of 200-400 words about why you chose to keep or change their original phrase. Students will discuss their new phrases and justifications in **small groups** and will be asked to focus on the key aspects of the class that resulted in a new phrase and perspective – or – the reasons that their original phrase aligns with the core material from the class.

Evaluation: Lab assignment 7 (six words revision) and participation in discussion

Learning Outcomes Met:

- Recall and critically assess various depictions, definitions, and conceptualizations of sustainability, sustainable development, and resilience.
- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability

ENR / AEDE 2501

Introduction to Sustainability Fall 2023

Course Information

- **Course times and location:**
 - Lectures: No required schedule meetings; all instruction occurs in Carmen each week
 - Laboratory: Sections will meet at specified time dictated by the section in which students enrolled
- **Credit hours:** 4
- **Mode of delivery:**
 - Lectures: Asynchronous
 - Laboratory: Synchronous

Instructors

- **Name:** TBD
- **Email:** TBD
- **Phone Number:** TBD
- **Office location:** TBD
- **Office hours:** TBD
- **Preferred means of communication:**
 - Our preferred method of communication for questions is **email**.
 - Our class-wide communications will be sent through the Announcements tool in CarmenCanvas. Please check your [notification preferences](https://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to be sure you receive these messages.

Teaching Assistant

- **Name:** TBD
- **Email:** TBD
- **Recitation times:** TBD

Course Prerequisites

None



Course Description

This course introduces students to principles from various disciplines that are related to social, economic and environmental sustainability. Students will evaluate key concepts and examine tradeoffs that are a part of sustainability action using case studies representing sustainability challenges that can be viewed from numerous perspectives.

This course is designed to integrate theories, concepts, and approaches from multiple disciplines to expose students to the diversity of ways that sustainability challenges can be conceptualized, framed, and addressed.

Goals

Sustainability requires knowledge of human and natural systems and the skills to manage change and think holistically across scales in time and space. The course introduces students to skills and concepts necessary for a fruitful career in sustainability and for critically evaluating key concepts and popular discourse. The primary goals of this course are to (1) develop the foundational knowledge and skills that students will require to grasp the multi-dimensional and multi-disciplinary nature of sustainability (2) introduce students to sustainability concepts from different disciplines and (3) introduce the tradeoffs that are often a part of sustainability thinking, planning, and action. The course also provides students with a common framework for additional sustainability-oriented courses offered across campus. Students will be introduced to the fundamental principles, concepts, and knowledge from ecology and environmental science, economics and business, community and international development and sustainability science. Because sustainability can be laden with ideological thinking that can sometimes cloud important issues and avenues for advancement, we will employ a scientific perspective to examine the obstacles and opportunities for social, economic, and environmental sustainability.

OSU's Sustainability Education and Learning Committee identified six dimensions of sustainability to categorize the content of sustainability programs and courses. Each of the four main topic areas for this course addresses each of the six dimensions to different degrees as illustrated by the table below:

Six Dimensions	Human – natural systems	Environmental & earth systems	Economy & governance	Society & culture	Engineering, technology, & design	Health & Well-being
Consumption						
Water						
Climate / Energy						
Biodiversity						
Most emphasis / depth						Least emphasis / depth

Learning Outcomes

By the end of this course, students should successfully be able to:

- Recall and critically assess various depictions, definitions, and conceptualizations of sustainability, sustainable development, and resilience.

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Describe how a scientific approach is important to examine the connections, tradeoffs, and synergies across environmental, economic, and social components that are involved in achieving sustainability goals
- Demonstrate an appreciation of how ecosystem function changes in response to human and nonhuman influences, how humans use and impact ecosystem services, and the implications of these human-environment interactions for sustainability
- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability

General Education Expected Learning Outcomes

As part of the **Sustainability Theme** of the General Education curriculum, this course addresses the following goals:

1. Successful students will analyze sustainability at a more advanced and in-depth level than in the Foundations component.
2. Successful students will integrate approaches to sustainability by making connections to out-of- classroom experiences with academic knowledge or across disciplines and/or to work they have done in previous classes and that they anticipate doing in future.
3. Successful students will analyze and explain how social and natural systems function, interact and evolve over time; how human well-being depends on these interactions; how actions have impacts on subsequent generations and societies globally; and how human values, behaviors and institutions impact multifaceted potential solutions across time.

As part of the **Sustainability Theme** of the General Education curriculum, this course is designed to prepare students to:

- 1.1 Engage in critical and logical thinking about the topic or idea of sustainability
- 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of sustainability

2.1 Identify, describe, and synthesize approaches or experience as they apply to sustainability

2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment and creative work, building on prior experiences to respond to new and challenging contexts.

3.1 Describe elements of the fundamental dependence of humans on Earth and environmental systems, and on the resilience of those systems

3.2 Describe, analyze, and critique the roles and impacts of human activity and technology on both human society and the natural world, in the past, present, and future

3.3 Devise informed and meaningful responses to problems and arguments in the area of sustainability based on the interpretation of appropriate evidence and an explicit statement of values

This course fulfills these learning outcomes by requiring students to synthesize material from several disciplines across the natural and social sciences so that they develop a holistic and integrative perspective on sustainability and sustainable development. More specifically, the course introduces perspectives from economics, business, and multiple social science disciplines (e.g., sociology, anthropology, psychology, geography, political science) that contribute to sustainable business practices as well as the research on, and practice of, sustainable community and international development. The course is taught from a systems perspective, encouraging students to examine how ecological systems, social systems, and the economy interact. Assessments include combination of lecture material, class discussions, lab section discussions, exam and quiz questions, class activities, and homework assignments.

How This Course Works

Mode of delivery: This course is 100% online. For lecture periods, there are no required sessions when you must be logged in to Carmen at a scheduled time. **Laboratory sections are synchronous so students must attend the lab section during the allotted time. This time will depend on the section in which a student enrolled.** All laboratory activities will happen online with discussions happening synchronously via zoom. Discussions may involve the full lab section or smaller peer groups that will have discussions in breakout rooms.

Pace of online activities: This course is divided into **weekly modules** that are released one week ahead of time. Students are expected to keep pace with weekly deadlines but may schedule their efforts freely within that time frame. The only regularly scheduled meetings are the laboratory sections which will be held online at the specified time.

Co-Teaching: To ensure that students are exposed to the multi-disciplinary nature of sustainability, this course is co-taught by instructors with different disciplinary backgrounds and training. **One instructor, affiliated with AEDE, is an Environmental Economist who also has training in business administration and conducts research on forest cover, land use change, and climate change. The other**

instructor, affiliated with SENR, is a Sustainability Scientist, with a focus on social-ecological systems and an interdisciplinary background that includes a mix of conservation biology and various social science disciplines. The course is designed such that the instructors will provide multiple perspectives on each of the core topics covered during the semester. Most importantly both instructors will be involved in producing materials and assignments for each weekly module. Students will view lecture materials from one instructor, but their discussion of those materials will be shaped by the other instructor. This structure ensures that students are gaining perspectives from multiple disciplines throughout each weekly module. For instance, one instructor might produce a lecture discussing the ways in which technological innovations and development of more efficient production methods can reduce carbon emissions. The other instructor may then post discussion questions that require students to draw on course readings and consider whether and how such approaches address economic inequalities as well as whether an emphasis on technological efficiencies is sufficient given the scale of the climate challenge. In addition, throughout the semester both instructors will respond to a set of general prompts (see below) and as well as questions submitted by students so that the class will see how individuals with different disciplinary backgrounds craft different responses. Example prompts include:

- Is there a standard definition of “sustainability” or “sustainable development” in your discipline? If so, what is it?
- How does your discipline view the relationship between consumption, consumerism, and well-being?
- What are the most effective strategies and/or policies for addressing climate change in different contexts?
- Describe the factors that have shaped conflicts and cooperation related to water use and management in different contexts.
- What are the pros and cons of emphasizing technological solutions for addressing water scarcity and climate change as opposed to social, cultural, or behavioral solutions?
- Etc...

The common structure of prompts will help highlight the different ways that disciplines may frame, explain, and develop solutions to sustainability challenges. In addition, the instructors and TAs will rotate through lab sections and will spend the first 15 minutes of each lab section re-capping the previous weeks’ topic and sharing a contrasting perspective.

Credit hours and work expectations: This is a 4 credit-hour course. According to [Ohio State bylaws on instruction](#) (go.osu.edu/credithours), students should expect around 5 hours per week of time spent on direct instruction (instructor content, laboratory exercises, and Carmen activities, for example) in addition to 7-8 hours of homework (reading and assignment preparation, for example) to receive a grade of [C] average.

Attendance and participation requirements: Research shows regular participation is one of the highest predictors of success. With that in mind, we expect that students will attend lecture and lab sections and regularly contribute to class discussions.

- **Participating in online activities for attendance: at least once per week**
You are expected to log in to the course in Carmen every week. During most weeks you will probably log in many times. If you have a situation that might cause you to miss an entire week of class, discuss it with me *as soon as possible*.

- **Zoom meetings and office hours: optional**
All live, scheduled events for the course, including my office hours, are optional. I will post recordings of synchronous sessions for those who cannot attend.
- **Participating in discussion forums: two or more times per week**
As part of your participation, each week you can expect to post at least twice as part of our substantive class discussion on the week's topics.
- **Participating in Laboratory meetings: weekly**
As part of your grade, you are expected to join your laboratory group on a weekly basis, at the scheduled time, to engage in lab activities and discussions.

Course Materials, Fees and Technologies

Required Materials and/or Technologies

- There is no required textbook and there are no required technologies beyond those that are necessary for logging into the course website on Carmen

Required Equipment

- **Computer:** current Mac (MacOS) or PC (Windows 10) with high-speed internet connection.
- **Webcam:** built-in or external webcam, fully installed and tested
- **Microphone:** built-in laptop or tablet mic or external microphone
- **Other:** a mobile device (smartphone or tablet) to use for BuckeyePass authentication

If you do not have access to the technology you need to succeed in this class, review options for [technology and internet access](https://go.osu.edu/student-tech-access) (go.osu.edu/student-tech-access).

Required Software

Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365. Visit the [installing Office 365](https://go.osu.edu/office365help) (go.osu.edu/office365help) help article for full instructions.

CarmenCanvas Access

You will need to use [BuckeyePass](https://buckeyepass.osu.edu) (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you do each of the following:

- Register multiple devices in case something happens to your primary device. Visit the [BuckeyePass - Adding a Device](https://go.osu.edu/add-device) (go.osu.edu/add-device) help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes, good for 365 days, that can each be used once.



- [Install the Duo Mobile application](https://go.osu.edu/install-duo) (go.osu.edu/install-duo) on all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at [614-688-4357 \(HELP\)](tel:614-688-4357) and IT support staff will work out a solution with you.

Technology Skills Needed for This Course

- Basic computer and web-browsing skills
- [Navigating CarmenCanvas](https://go.osu.edu/canvasstudent) (go.osu.edu/canvasstudent)
- [CarmenZoom virtual meetings](https://go.osu.edu/zoom-meetings) (go.osu.edu/zoom-meetings)
- [Recording a slide presentation with audio narration and recording, editing and uploading video](https://go.osu.edu/video-assignment-guide) (go.osu.edu/video-assignment-guide)

Technology Support

For help with your password, university email, CarmenCanvas, or any other technology issues, questions or requests, contact the IT Service Desk, which offers 24-hour support, seven days a week.

- **Self Service and Chat:** go.osu.edu/it
- **Phone:** [614-688-4357 \(HELP\)](tel:614-688-4357)
- **Email:** servicedesk@osu.edu

Grading and Faculty Response

How your grade is calculated

Assignment category	Points
Homework 1: “Six words” for sustainability	40
Homework 2: Driving patterns and consumption	40
Homework 3: Klamath basin dams	40
Homework 4: Corporate sustainability	40
Homework 5: GMOs, land use, and biodiversity	40
Homework 6: New ideas for sustainability	40
12 weekly discussion prompts (5 pts each)	60
Lab section assignments (7 assignments – 10 pts each)	70
Mid-term exam 1	50
Mid-Term exam 2	50
Final Exam	100
Participation in Lab Discussions	100
Total	670

See course schedule, below, for due dates.

Descriptions of Major Course Assignments

WRITTEN HOMEWORK ASSIGNMENTS

Six homework assignments will be provided during the term. These homework assignments focus on developing your critical thinking skills by providing you with an opportunity to apply the material learned in the modules to real world situations. See the course website for details and rubrics for each assignment.

Academic integrity and collaboration: Homework assignments are open book but must be completed individually and without the help of other individuals. You are

encouraged to ask a trusted person to proofread your assignments before you turn them in but no one else should revise or rewrite your work. Plagiarized work will result in a grade of 0% and may be reported to Ohio State Academic Affairs.

LABORATORY SECTION ASSIGNMENTS

On multiple occasions, written homework assignments will be discussed in lab sections. On the weeks when there is no written homework assignment, there will be short assignments (discussion questions, video submissions, etc.) that you will be required to submit before the beginning of lab. These short assignments will be used to demonstrate your understanding of the assigned reading, listening or viewing materials as well as to initiate discussions and introduce you to the topic of that week's lab. Details for these assignments can be found in the laboratory section schedule below and on the Carmen site for the course.

Academic integrity and collaboration: Your laboratory section assignments should be your own original work. You are encouraged to ask a trusted person to proofread your assignments before you turn them in but no one else should revise or rewrite your work. Plagiarized work will result in a grade of 0% and may be reported to Ohio State Academic Affairs.

PARTICIPATION IN LABORATORY DISCUSSIONS

Most lab sessions will include a discussion based on the written assignments that are submitted for that lab period and/or activities that are conducted in lab on that day. These discussions will be structured around questions/prompts that are provided by the instructors and/or by students. Students will be graded based on the quality and frequency of their participation in both small group and full-class discussions and their ability to demonstrate attributes of critical thinking about the focal topic of the day. This includes participating in discussion board threads as well as synchronous zoom discussions. In the event that a student has an excused absence during a lab section, they will be permitted to submit written responses to the discussion prompts that were used in class.

WEEKLY DISCUSSION PROMPTS

There are 12 untimed and graded online discussion prompts during the term. They are required and will be due by 11:59pm on the Sunday of the week they are assigned. There will be between 1 and 3 discussion prompts per week that will involve short answers and that will require students to consider the week's lecture material from a



different disciplinary point of view. These prompts will ask students to think critically about the week's lecture material. All discussions will be online using Carmen. If you do not respond to the prompt(s) before the assignment closes, you will earn a grade of 0%.

Academic integrity and collaboration: Each student must complete the quiz on her or his own. You are NOT permitted to receive assistance from anyone else during the quiz. You are NOT permitted to take a quiz as part of a group. You are on your honor to complete the quizzes on your own without help from another person. You ARE permitted to use notes, slides, calculator, textbook, journal articles, books, and Internet during the exam. Additional details will be provided during the semester.

ONLINE EXAMS

There are 3 timed and graded online exams during the term. Examinations may consist of true/false, multiple choice, and short answer questions. All exams will be taken online using **Carmen**. Exams will be open on Carmen for approximately 24 hours and you can take the exam anytime during these 24 hours. You will be given 80 minutes to complete the exam. This is the typical time that would be allowed if the exam were given in a regular classroom setting. If you fail to complete the exam on Carmen before it closes you will earn a grade of 0%. A significant number of exam questions will come from material presented in lectures. Additional material will be drawn from the readings, videos, or other assigned materials. The final exam will be longer and comprehensive. Students will have additional time that matches the length of an in-person final exam period, to complete the final exam. Excuses for missing an exam must be presented to the instructors prior to the exam when at all possible.

Academic integrity and collaboration: Each student must complete the exam on her or his own. You are NOT permitted to receive assistance from anyone else during the exam. You are NOT permitted to take the exams as part of a group. You ARE permitted to use notes, slides, calculator, textbook, journal articles, books, and Internet during the exam. Additional details will be provided during the semester.

There are **NO make-up exams** except for valid reasons (e.g., medical excuse). If you are sick, you must have a note signed by your medical doctor (i.e., a licensed physician) and dated the same day as the exam and excusing you from the 24-hour period that the exam is open. Otherwise, you will receive a 0 on the exam. The instructor will determine if your excuse is valid. If you do **not** have a reasonable excuse for missing an exam, then you will receive a zero for the exam. Approved make-up exams will consist of multiple choice, short-answer and essay questions.



Late Assignments

Please refer to Carmen for due dates. To receive full credit, work must be turned-in on time and in condition to be evaluated. Late assignments will incur a deduction of 10% of the total point value for each 24-hour period that they are late (including weekends). Late assignments can be turned in for up to 7 days (including weekends) after they are due with the penalty described above. After that, students will receive a 0 for the assignment. Excuses for missed or late assignments – even valid ones – will not be accepted more than 7 days after the assignment due date.

Extenuating circumstances sometimes occur. Students who miss an assignment due to a legitimate reason (e.g., emergency, hospital visit, extended illness) should contact the instructors as soon as possible and provide documentation to request permission to make-up an assignment. Accommodations will be made on a case-by-case basis. If approved, the student will not be penalized for a late submission and the student must make up the missed assignment within a time frame specified by the instructor.

Instructor Feedback and Response Time

I am providing the following list to give you an idea of my intended availability. Remember that you can call [614-688-4357 \(HELP\)](tel:614-688-4357) at any time if you have a technical problem.

- **Preferred contact method:** If you have a question, please contact either of us first through our Ohio State email addresses. One of us will reply to emails within **24 hours on days when class is in session at the university**.
- **Class announcements:** We will send all important class-wide messages through the Announcements tool in CarmenCanvas. Please check [your notification preferences](https://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to ensure you receive these messages.
- **Grading and feedback:** For assignments submitted before the due date, we will try to provide feedback and grades within **seven days**. Assignments submitted after the due date may have reduced feedback and grades may take longer to be posted.

Grading Scale

93–100: A	80–82.9: B-	67–69.9: D+
90–92.9: A-	77–79.9: C+	60–66.9: D
87–89.9: B+	73–76.9: C	Below 60: E
83–86.9: B	70–72.9: C-	

Other Course Policies



Discussion and Communication Guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style:** While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. A more conversational tone is fine for non-academic topics.
- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online. I will provide specific guidance for discussions on controversial or personal topics.
- **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say. For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.
- **Backing up your work:** Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.
- **Synchronous sessions (laboratory only):** During our Zoom laboratory sessions I ask you to use your real name and a clear photo of your face in your Carmen profile. When in breakout rooms or other small-group discussions, having cameras and mics on as often as possible will help you get the most out of activities. You are always welcome to use the [free, Ohio State-themed virtual backgrounds](https://go.osu.edu/zoom-backgrounds) (go.osu.edu/zoom-backgrounds). Remember that zoom and the Zoom chat are our classroom space where respectful interactions are expected.]

Ohio State's Academic Integrity Policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute Academic Misconduct.

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: Any activity that tends to compromise the academic integrity of the University or subvert the educational process. Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an excuse for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.



If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- [Committee on Academic Misconduct](http://go.osu.edu/coam) (go.osu.edu/coam)
- [Ten Suggestions for Preserving Academic Integrity](http://go.osu.edu/ten-suggestions) (go.osu.edu/ten-suggestions)
- [Eight Cardinal Rules of Academic Integrity](http://go.osu.edu/cardinal-rules) (go.osu.edu/cardinal-rules)

Copyright for Instructional Materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

1. Online reporting form at equity.osu.edu,
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or Email equity@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.

Diversity Statement

The Ohio State University affirms the importance and value of diversity of people and ideas. We believe in creating equitable research opportunities for all students and to providing programs and curricula that allow our students to understand critical societal challenges from diverse perspectives and aspire to use research to promote sustainable solutions for all. We are committed to maintaining an inclusive community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among all members; and encourages each individual to strive to reach their own potential. The Ohio State University does not discriminate on the basis of age, ancestry, color, disability, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, race, religion, sex, gender, sexual orientation, pregnancy, protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment.

To learn more about diversity, equity, and inclusion and for opportunities to get involved, please visit:

- <https://odi.osu.edu/>
- <https://odi.osu.edu/racial-justice-resources>
- <https://odi.osu.edu/focus-on-racial-justice>
- <http://mcc.osu.edu/>

In addition, this course adheres to **The Principles of Community** adopted by the College of Food, Agricultural, and Environmental Sciences. These principles are located on the Carmen site for this course; and can also be found at <https://go.osu.edu/principlesofcommunity>. For additional information on Diversity, Equity, and Inclusion in CFAES, contact the CFAES Office for Diversity, Equity, and Inclusion (<https://equityandinclusion.cfaes.ohio-state.edu/>). If you have been a victim of or a witness to a bias incident, you can report it online and anonymously (if you choose) at <https://equity.osu.edu/>.

Your Mental Health

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 Counseling and

Consultation Services (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

David Wirt, wirt.9@osu.edu, is the CFAES embedded mental health counselor. He is available for new consultations and to establish routine care. To schedule with David, please call 614-292-5766. Students should mention their affiliation with CFAES when setting up a phone screening.

Disability Accommodations

The university strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process, managed by Student Life Disability Services. 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.

Disability Services Contact Information

- Phone: [614-292-3307](tel:614-292-3307)
- Website: slds.osu.edu
- Email: slds@osu.edu
- In person: [Baker Hall 098, 113 W. 12th Avenue](#)

Accessibility of Course Technology

This online course requires use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations as early as possible.

- [CarmenCanvas accessibility](https://go.osu.edu/canvas-accessibility) (go.osu.edu/canvas-accessibility)
- Streaming audio and video
- [CarmenZoom accessibility](https://go.osu.edu/zoom-accessibility) (go.osu.edu/zoom-accessibility)



Course Schedule

- Information on assigned readings can be found on the Carmen site in the module for each week. Due dates for all assignments, discussions and quizzes will be clearly indicated on the Carmen site for the class. **Please see the table below this one for additional descriptions of lab activities and assignments.**

LECTURE SCHEDULE

Week	Lectures	Topics and Assigned Reading / Listening / Viewing	Assignments & Quizzes
SECTION I – INTRODUCTION AND BACKGROUND			
1	Lect 1	Class overview and overview of the Anthropocene GE learning objectives 3.1, 3.2	
	Lect 2	What is sustainability? – definitions and perspectives Gallopín, G. C. (2003). <i>A systems approach to sustainability and sustainable development</i> . ECLAC. Robert, K. W., Parris, T. M., & Leiserowitz, A. A. (2005). What is sustainable development? Goals, indicators, values, and practice. <i>Environment: science and policy for sustainable development</i> , 47(3), 8-21. GE learning objectives 1.1, 1.3	Weekly Quiz 1
LAB 1 – Sustainability Graffiti and Introductions			
<i>Students will get to know each other and describe the different ways you think about and prioritize aspects of sustainability and ways of addressing sustainability challenges</i>			
No assigned reading			
GE learning objectives 1.1, 1.2, 2.1, 2.2			
2	Lect 3	What is sustainability? – foundational concepts Mann (2018) Can planet earth feed 10 billion people? The Atlantic. Purvis et al. (2019). Three pillars of sustainability: in search of conceptual origins. <i>Sustainability</i> . 14:681-695	Homework 1: Six words for sustainability GE learning objectives 1.1, 1.2
	Lect 4	Introduction to economic and business concepts	Weekly Quiz 2



		<p>Chapter 1 in Esty, DC and AS Winston. 2006. <i>Green to Gold: How Smart Companies Use Environmental Strategy to Innovate, Create, and Build Competitive Advantage</i>. New York: Wiley</p> <p>Solow, R.M., 1991. Sustainability: an economist's perspective. J Seward Johnson Lecture at Woods Hole Oceanographic Institute. June 14, 1991.</p> <p>Chapter 12 in Langert, B. 2019. <i>The Battle to do Good: Inside McDonald's Sustainability Journey</i>. Emerald Group Publishing.</p> <p>GE learning objectives 1.1, 3.1,</p>	Six words for sustainability comments due
<p>LAB 2 – Six Words for Sustainability</p> <p><i>Students will identify and discuss how they define and conceptualize “sustainability” and the lens through which they examine sustainability challenges and solutions</i></p> <p>See suggested reading for Homework 1</p> <p>GE learning objectives 1.1, 1.2, 2.1, 2.2</p>			
3	Lect 5	<p>Overview of development, poverty, community & inequality</p> <p>Schafer, J., Haslam, P. A., & Beaudet, P. (2009). Meaning, measurement, and morality in international development. <i>Introduction to international development: Approaches, actors, and issues</i>, 2-27.</p> <p>Green, G. P., & Haines, A. (2016). The role of assets in community-based development. <i>Asset Building & Community Development</i>; SAGE Publications, Inc.: New York, NY, USA, 1-31.</p> <p>Hobbes, M. (2014). The problem with international development—and a plan to fix it. <i>New Republic</i>. Available at: http://www.newrepublic.com/article/120178/probleminternational-development-and-plan-fix-it.</p> <p>GE learning objectives 1.1</p>	
<p>SECTION II - CONSUMPTION</p>			
3	Lect 6	<p>Population and consumption</p> <p>Kates, R. W. (2000). Population and consumption: what we know, what we need to know. <i>Environment: Science and Policy for Sustainable Development</i>, 42(3), 10-19.</p> <p>Jahren, H. (2020). Chapter 2: Who we are. <i>The Story of More: How We Got to Climate Change and Where to Go from Here</i>. Hachette UK.</p> <p>GE learning objectives 1.1, 1.2, 2.1</p>	Weekly Quiz 3
<p>LAB 3 – Measuring Progress</p>			



Students will compare, and contrast different ways that “progress” has been defined and measured and how this has contributed to current global problems, but may help guide solutions for more sustainable societies

<https://www.youtube.com/watch?v=XAaNaJQVNoY>

<https://www.youtube.com/watch?v=sAtMqwh21Eo>

https://www.youtube.com/watch?v=zhWkTiMVVVI&feature=player_embedded

<https://stories.council.science/stories-human-development/3/>

Papers: Van den Bergh, J. C. (2009). The GDP paradox. *Journal of economic psychology*, 30(2), 117-135.
Costanza, R., Hart, M., Talberth, J., & Posner, S. (2009). Beyond GDP: The need for new measures of progress. *The pardee papers*.

Costanza, R., Kubiszewski, I., Giovannini, E., Lovins, H., McGlade, J., Pickett, K. E., ... & Wilkinson, R. (2014). Development: Time to leave GDP behind. *Nature*, 505(7483), 283-285.

Bleys, B. (2012). Beyond GDP: Classifying alternative measures for progress. *Social indicators research*, 109(3), 355-376.

GE learning objectives 1.1, 1.2, 3.2, 3.3

4	Lect 7	<p>Econ and business perspectives on consumption I</p> <p>Fernholz, K. and Bowyer, J., 2015. The spectrum of forest usage: From livelihood support to large scale commercialization. In <i>Forests, Business and Sustainability</i> (pp. 21-40). Routledge.</p> <p>"Consumption" Britannica Online Eyclopedia</p> <p>Papola, J. "Think Consumption is the Engine of our Economy? Think Again. Forbes. 01/30/2013</p> <p>GE learning objectives 1.1, 1.2, 2.1</p>	
	Lect 8	<p>Econ and Business perspectives on consumption II</p> <p>Nordhaus, W.D., 2000. New directions in national economic accounting. <i>American Economic Review</i>, 90(2), pp.259-263.</p> <p>Pilling, D. Five Ways GDP gets it Totally Wrong as a Measure of Success. World Economic Forum. January 17, 2018.</p> <p>Wikipedia: Green Gross Domestic Product.</p>	Weekly Quiz 4

LAB 4 – Work, Well-Being, and Consumption

Students will discuss the social and economic structures that shape our lives, how those structures impact our consumption patterns, and what this means for our well-being and sustainability in general

Listen to assigned Ezra Klein podcast with James Suzman:

<https://www.nytimes.com/2021/06/29/opinion/ezra-klein-podcast-james-suzman.html>

Watch the 21 hours video by NEF: <https://www.youtube.com/watch?v=580Vyl6hFmo>

GE learning objectives 1.1, 1.2, 2.1, 2.2, 3.3

5	Lect 9	<p>Social, psychological, and anthropological perspectives on why we consume</p> <p>Wilk (2002) Consumption, human needs, and global environmental change." <i>Global environmental change</i> 12 (1): 5-13.</p> <p>GE learning objectives 2.1, 2.2, 3.2</p>	<p>Homework 2: Driving patterns and consumption</p> <p>GE learning objectives 2.1, 3.2, 3.3</p>
	Lect 10	<p>How can we consume more sustainably I?</p> <p>Parrique, T., Barth, J., Briens, F., Kuokkanen, A., & Spangenberg, J. H. (2019). Evidence and arguments against green growth as a sole strategy for sustainability. <i>European Environmental Bureau</i>.</p> <p>Howarth, R. B. (2012). Sustainability, well-being, and economic growth. <i>Minding Nature</i>, 5(2), 32-39.</p> <p>Frank (2020): Spend more on society and get more for yourself. NY Times.</p> <p>GE learning objectives 2.1, 2.2, 3.2,</p>	Weekly Quiz 5
<p>LAB 5 – Systems thinking and Sustainable transportation</p> <p><i>Students will discuss multiple ways of fostering more sustainable forms of transportation and the systems, structures, and social, cultural, and economic tradeoffs that are associated with these solutions</i></p> <p>https://mahb.stanford.edu/blog/systems-thinking-can-help-build-sustainable-world-beginning-conversation/</p> <p>Smith, T. (2011). Using critical systems thinking to foster an integrated approach to sustainability: A proposal for development practitioners. <i>Environment, development, and sustainability</i>, 13(1), 1-17.</p> <p>GE learning objectives 1.1, 1.2, 2.1, 2.2, 3.2, 3.3</p>			
6	Lect 11	<p>How can we consume more sustainably II?</p> <p>GE learning objectives 2.1, 2.2, 3.2,</p>	
<p>SECTION III - WATER</p>			
6	Lect 12	<p>Sustainability and Water</p> <p>Braden, J.B. and Shortle, J.S., 2013. Agricultural sources of water pollution. In <i>Encyclopedia of Energy, Natural Resource and Environmental Economics</i>. (pp. 81-85). Elsevier.</p> <p>Earnhart, D., 2013. Water pollution from industrial sources. In <i>Encyclopedia of Energy, Natural Resource and Environmental Economics</i>. (pp. 114-120) Elsevier</p> <p>Anderson, T.L., Scarborough, B., and Watson, L.R., 2013. Water crises, water rights, and water markets. In <i>Encyclopedia of</i></p>	Weekly Quiz 6



		<p><i>Energy, Natural Resource and Environmental Economics.</i> (pp. 248-254) Elsevier Inc.</p> <p>GE learning objectives 1.1, 1.2, 3.1</p>	
<p>LAB 6 – Economic Valuation and Natural Capital</p> <p><i>Students will use data to value natural capital on campus and evaluate tradeoffs between different policy scenarios related to infrastructure change</i></p> <p>Read report on Economic Value of Natural Areas in Ohio and view the YouTube video "How are countries Doing Natural Capital Accounting?"</p> <p>https://aede.osu.edu/https%3A/aede.osu.edu/faculty-outreach/economic-value-natural-areas-ohio</p> <p>https://www.youtube.com/watch?v=sg-xu31Emws</p> <p>GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3</p>			
7	Lect 13	<p>The economics of water quality and quantity</p> <p>Same readings as Lecture 12.</p> <p>GE learning objectives 1.1, 1.2, 3.1</p>	<p>Midterm Exam 1</p> <p>GE learning objectives 1.1, 1.2</p>
	Lect 14	<p>Water and community development</p> <p>Doremus, H., & Tarlock, A. D. (2003). Fish, farms, and the clash of cultures in the Klamath basin. <i>Ecology LQ</i>, 30, 279.</p> <p>GE learning objectives 1.1, 1.2, 2.1, 3.1</p>	Weekly Quiz 7
<p>LAB 7 – Tradeoffs and Ecosystem Services</p> <p><i>Students will use multi-attribute utility theory to explore tradeoffs and describe how this tool can facilitate collective decision-making. Students will see how different stakeholders use and value water</i></p> <p>McGraw-Hill Environmental Case Study: "Sharing the Klamath"</p> <p>Section 1.3 on pages 1-61 to 1-68, including table 1.3-1 of US Department of Interior, Bureau of Reclamation. 2012. Benefit Cost and Regional Economic Development. Technical Report for the Secretarial Determination on Whether to Remove Four Dams on the Klamath River in California and Oregon</p> <p>News article from the High Country News (Aug, 27, 2021): Klamath River issues explained. https://www.hcn.org/articles/klamath-basin-confused-about-whats-happening-on-the-klamath-heres-a-rundown/print_view</p> <p>News article from Sacramento News and Review (June, 29, 2021): https://sacramento.newsreview.com/2021/06/29/hopes-for-imperiled-fish-rise-as-ferc-approves-transfer-of-klamath-river-dam-license/</p>			



GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3			
8	Lect 15	Water and international development GE learning objectives 1.1, 1.2, 3.1	Homework 3: Klamath Dams GE learning objectives 2.1, 2.2, 3.2, 3.3
FALL BREAK			
9	Lect 16	Business and Water Sommer, A., and B. Sohngen. 2002. "Pricing the Environment: An Introduction." OSU Extension Fact Sheet. Loomis, J. 1997. "Use of Non-Market Valuation Studies in Water Resources Management Assessments." Water Resources Update, Universities Council on Water Resources. Issue No. 109: Autumn 1997 Boccaletti, G, M Grobbel, and MR Stuchtey. 2009. The Business Opportunity in Water Conservation. McKinsey Quarterly. December 1, 2009.	
LAB 8 – Life-cycle assessment			
<i>Students will conduct a life-cycle assessment to explore the impacts of different products as well as how such assessments can impact consumption decision, supply chain decisions, and policies</i>			
Chapters 1 and 2 in Shaked, S., Crettaz, P., Saade-Sbeih, M., Jolliet, O. and Jolliet, A., 2015. <i>Environmental life cycle assessment</i> . CRC Press. (Pp. 1-21)			
Hoogmartens, R., Van Passel, S., Van Acker, K. and Dubois, M., 2014. Bridging the gap between LCA, LCC and CBA as sustainability assessment tools. <i>Environmental Impact Assessment Review</i> , 48, pp.27-33.			
GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3			
SECTION IV – CLIMATE & ENERGY			
	Lect 17	Introduction to Climate/Energy IPCC Working Group I. 2021. The Physical Science Basis. Summary for Policymakers. BP. 2021. Energy Outlook. Pages 0-31:	Weekly Quiz 8



		<p>Nordhaus, William (2017): Integrated assessment models of climate change, NBER Reporter, National Bureau of Economic Research (NBER), Cambridge, MA, Iss. 3, pp. 16-20</p> <p>View this video on discounting (7:46)</p> <p>https://www.youtube.com/watch?v=Mol1yT7tczY</p> <p>GE learning objectives 1.1, 1.2, 3.1, 3.2</p>	
<p>LAB 9 – Metrics for corporate sustainability</p> <p><i>Students will critically evaluate corporate sustainability metrics and how they have evolved, describe recent improvements in sustainability accounting, and discuss what gaps remain</i></p> <p>Bernow, S., J. Godsall, B. Klempner, and C. Merten. 2019. More than values: The value-based sustainability reporting that investors want. McKinsey and Company. https://www.mckinsey.com/business-functions/sustainability/our-insights/more-than-values-the-value-based-sustainability-reporting-that-investors-want</p> <p>2020 Business and ESG Report for The Coca-Cola Company. https://d1io3yog0oux5.cloudfront.net/cocacolacompany/files/pages/cocacolacompany/db/761/description/coca-cola-business-environmental-social-governance-report-2020+%282%29.pdf</p> <p>GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3</p>			
10	Lect 18	<p>Climate/Energy - economics and business</p> <p>Same as above</p> <p>GE learning objectives 1.1, 1.2, 3.1, 3.2</p>	
	Lect 19	<p>Climate/Energy - economics and business</p> <p>Same as above.</p> <p>GE learning objectives 1.1, 1.2, 3.1, 3.2</p>	<p>Weekly Quiz 9</p> <p>Homework 4: Corporate sustainability</p> <p>GE learning objectives 1.1, 1.2, 2.2, 3.2, 3.3</p>
<p>LAB 10 – Indigenous rights, climate change, and REDD+</p> <p><i>Students will examine the governance challenges that accompany large-scale programs that address global climate change and describe the importance of property rights, land tenure, and land security</i></p> <p>Barbier, E. B., & Tesfaw, A. T. (2012). Can REDD+ save the forest? The role of payments and tenure. <i>Forests</i>, 3(4), 881-895.</p> <p>Newton, P., Oldekop, J. A., Brodnig, G., Karna, B. K., & Agrawal, A. (2016). Carbon, biodiversity, and livelihoods in forest commons: synergies, trade-offs, and implications for REDD+. <i>Environmental Research Letters</i>, 11(4), 044017.</p>			



<p>Andersson, K. P., Smith, S. M., Alston, L. J., Duchelle, A. E., Mwangi, E., Larson, A. M., ... & Wong, G. Y. (2018). Wealth and the distribution of benefits from tropical forests: Implications for REDD+. <i>Land use policy</i>, 72, 510-522.</p> <p>GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3</p>			
11	Lect 20	<p>Climate/Energy and international development</p> <p>Larson, A. M., Brockhaus, M., Sunderlin, W. D., Duchelle, A., Babon, A., Dokken, T., ... & Huynh, T. B. (2013). Land tenure and REDD+: The good, the bad and the ugly. <i>Global environmental change</i>, 23(3), 678-689.</p> <p>https://www.youtube.com/watch?v=4Z4TIC1ObUI</p> <p>https://www.youtube.com/watch?v=FPFPUhsWMaQ</p> <p>GE learning objectives 1.1, 1.2, 3.1, 3.2</p>	
	Lect 21	<p>Climate/energy and communities</p> <p>Leyden, K. M. (2003). Social capital and the built environment: the importance of walkable neighborhoods. <i>American journal of public health</i>, 93(9), 1546-1551.</p> <p>Anguelovski, I., Connolly, J. J., Pearsall, H., Shokry, G., Checker, M., Maantay, J., ... & Roberts, J. T. (2019). Opinion: Why green “climate gentrification” threatens poor and vulnerable populations. <i>Proceedings of the National Academy of Sciences</i>, 116(52), 26139-26143.</p> <p>Mock, B. (2019). Why Detroit residents pushed back against tree-planting. <i>Bloomberg CityLab</i>, 11.</p> <p>GE learning objectives 1.1, 1.2, 3.1, 3.2</p>	Weekly Quiz 10
<p>LAB 11 – Critical perspectives on technology for sustainability</p> <p><i>Students will think critically about the role of technology in addressing sustainability challenges and evaluate the pros and cons of technology and the social and cultural implications of technological change</i></p> <p>Listen to Ezra Klein Podcast with L.M. Sacasas on the 41 Questions we should ask of the technologies and tools that shape our lives.</p> <p>https://www.nytimes.com/2021/08/03/opinion/ezra-klein-podcast-lm-sacasas.html</p> <p>GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3</p>			
<p>SECTION V – BIODIVERSITY</p>			
12	Lect 22	<p>Trends in biodiversity</p> <p>https://f.hubspotusercontent20.net/hubfs/4783129/LPR/PDFs/ENGLISH-FULL.pdf</p>	Midterm Exam 2



		GE learning objectives 1.1, 1.2, 3.1, 3.2	GE learning objectives 1.1, 1.2
		VETERAN'S DAY	
LAB 12 – Community-based conservation <i>After seeing community-based conservation and action, students will discuss the tension between biodiversity conservation and economic development, how the design, and impacts, of conservation programs are shaped by gender, and cultural variation in perspectives on wildlife and the environment</i> Watch the documentary “Milking the Rhino” (available through university libraries) GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3			
13	Lect 23	Biodiversity and sustainable development Adams, W. M., Aveling, R., Brockington, D., Dickson, B., Elliott, J., Hutton, J., ... & Wolmer, W. (2004). Biodiversity conservation and the eradication of poverty. <i>science</i> , 306(5699), 1146-1149. Gavin et al. (2018) Effective Biodiversity Conservation Requires Dynamic, Pluralistic, Partnership-Based Approaches. <i>Sustainability</i> . 10: 1845 – 1856 GE learning objectives 1.1, 1.2, 3.1, 3.2	Homework 5: New ideas for sustainability <i>(can be submitted at any time before this date)</i>
	Lect 24	Communities and Conservation Roe, D. (2008). The origins and evolution of the conservation-poverty debate: a review of key literature, events, and policy processes. <i>Oryx</i> , 42(4), 491-503. GE learning objectives 1.1, 1.2, 3.1, 3.2	Weekly Quiz 11
LAB 13 – Agriculture, biodiversity, and GMOs <i>Students will examine how different stakeholders, at different scales of governance and decision-making, view the relationships - and weigh potential tradeoffs - between agricultural productivity and biodiversity in the context of GMOs</i> Case Study for Chapter 14 in Duncan, Jancar-Webster, and Switky. 2009. World Politics in the 21 st Century. Student Choice Edition. New York: Houghton Mifflin. http://college.cengage.com/polisci/duncan/world_politics_sce/1e/assets/students/case/duncan_1e_case_ch14.pdf Lappe, Anna. 2011. The Battle for Biodiversity: Monsanto and Farmers Clash. The Atlantic. March 28 2011. http://www.theatlantic.com/health/archive/2011/03/the-battle-for-biodiversity-monsanto-and-farmers-clash/73117/ Aldhous, P. 2008. Genes for Greens. New Scientist. January 5, 2008 https://www.newscientist.com/article/mg19726372-900-could-new-gm-crops-please-the-greens/			



<p>Hamblin, J. 2016. The Fading meaning of GMO. The Atlantic. https://www.theatlantic.com/science/archive/2016/05/plants-for-the-planet/483132/</p> <p>Regis, E. 2019. "The True Story of the Genetically Modified Superfood that Almost Saved Millions" Foreign Policy. October 17, 2019. https://foreignpolicy.com/2019/10/17/golden-rice-genetically-modified-superfood-almost-saved-millions/#</p> <p>Regis, E. 2019. "Golden rice could save children. Until now, governments have barred it." Washington Post. November 11, 2019. https://www.washingtonpost.com/opinions/2019/11/11/golden-rice-long-an-anti-gmo-target-may-finally-get-chance-help-children/</p> <p>GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3</p>			
14	Lect 25	<p>Biodiversity and community development</p> <p>Brooks, J., Waylen, K. A., & Mulder, M. B. (2013). Assessing community-based conservation projects: A systematic review and multilevel analysis of attitudinal, behavioral, ecological, and economic outcomes. <i>Environmental Evidence</i>, 2(1), 1-34.</p> <p>GE learning objectives 1.1, 1.2, 3.1, 3.2</p>	
		THANKSGIVING	
15	Lect 26	<p>Biodiversity and economics</p> <p>Pearce, Fred. 2020. Parks vs. People: In Guatemala, Communities Take Best Care of the Forest. YaleEnvironment360: https://e360.yale.edu/features/parks-vs-people-in-guatemala-communities-take-best-care-of-the-forest (Links to an external site.)</p> <p>Radwin, Max. 2019. Fire, cattle, cocaine: Deforestation spikes in Guatemalan national park. Mongabay. https://news.mongabay.com/2019/06/invaders-cattle-cocaine-deforestation-spikes-in-guatemalan-national-park/ (Links to an external site.)</p> <p>Fortmann, L et al., 2017. Assessing the role of group heterogeneity in community forest concessions in Guatemala's Maya Biosphere Reserve. <i>Land Economics</i>. 93(3), pp.503-526. Download Fortmann, L et al., 2017. Assessing the role of group heterogeneity in community forest concessions in Guatemala's Maya Biosphere Reserve. <i>Land Economics</i>. 93(3), pp.503-526.</p> <p>Mukpo, Ashoka. 2021. The Brooklyn Bridge needs a makeover. Is rainforest lumber still in style? Mongabay. https://news.mongabay.com/2021/07/the-brooklyn-bridge-needs-a-makeover-but-is-rainforest-lumber-still-in-style/ (Links to an external site.)</p> <p>GE learning objectives 1.1, 1.2, 3.1, 3.2</p>	



	Lect 27	Biodiversity and economics Same readings	Weekly Quiz 12 Homework 6: GMOs and Biodiversity GE learning objectives 1.1, 1.2, 2.2, 3.1, 3.2, 3.3
LAB 14 – Revisiting our six words for sustainability			
<i>Students will reflect on how their understandings, definitions, and conceptualizations of sustainability have changed throughout the semester</i>			
Re-read your original Six Words post and justification			
GE learning objectives 1.1, 2.2, 3.3			
16	Lect 28	Synthesis and integration – returning to the pillars of sustainability	
	Dec 14th	FINAL EXAM: 2:00 – 3:45 pm	

LAB SECTION SCHEDULE

The laboratory component of this course is equivalent to 1-credit-hour. According to [Ohio State policy](#), students should expect to spend 2 hours per week in this laboratory. A student's 2-hour-work week includes direct instruction, taking notes, studying, readings, assignments, group work and completing labs. **Please note that the instructors will rotate among lab sections so you will have a different instructor, and gain a different point of view, each week.**

The activities and discussions outlined below will take place individually and in online discussion groups. **Small groups** for online discussions will be created by using the Carmen Learning Management System to randomly divide enrolled students into groups of 4-5. Students maintain group membership with this group of peers throughout the semester, which helps to form community within the course.

Items labeled as "Class discussions" in the lab section descriptions below will function as a common discussion for all students in the online section. For items labeled as "**Small groups**", students in the online section will work with their online peer groups. **See the main course calendar above for indicators of which Sustainability GE Learning objectives are addressed in each lab.**

Laboratory Topics, Activities, and Assessments

LAB 1 – Sustainability Graffiti and Introductions

Preparation: No assigned materials

Exercise: Introductions and Sustainability Graffiti.

Class discussion - Students introduce themselves and discuss their backgrounds, interests, and perspectives on sustainability. Students then walk around the room and write responses to a set of up to 15 posted prompts.

Small groups will be assigned a prompt and must summarize and comment on the responses to that prompt. These summaries will be shared with the class.

Evaluation: Participation in discussion

Learning Outcomes Met:

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others

LAB 2 – Six Words for Sustainability

Preparation: We want to hear what you think about sustainability before we get too far along in the course, so just clear your mind, and **Submit homework #1**

Exercise: Class Discussion of 6 six words assignment submissions. Students will present their six words and read their justification for the phrase they chose. As a class, students will compare, contrast, and categorize the phrases – including a set of past student submissions - creating a conceptual map of the different perspectives on sustainability that have emerged.

Small groups of students will then link the phrases to the definitions, depictions and conceptualizations of sustainability that were introduced in lecture as well as the foundational pillars for the class.

Evaluation: Participation in discussion

Learning Outcomes Met:

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.

- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others
- Recall and critically assess various depictions, definitions, and conceptualizations of sustainability, sustainable development, and resilience.

LAB 3 – Measuring Progress

Preparation: Watch short video on Gross National Happiness in Bhutan (examples are linked below), re-read articles on alternative measures of GDP and submit a 1-minute video of critiques of GDP based on their own internet research.

<https://www.youtube.com/watch?v=XAaNaJQVNoY>

<https://www.youtube.com/watch?v=sAtMqwh21Eo>

https://www.youtube.com/watch?v=zhWkTiMVWVI&feature=player_embedded

<https://stories.council.science/stories-human-development/3/>

Papers: Van den Bergh, J. C. (2009). The GDP paradox. *Journal of economic psychology*, 30(2), 117-135.
Costanza, R., Hart, M., Talberth, J., & Posner, S. (2009). Beyond GDP: The need for new measures of progress. *The pardee papers*.

Costanza, R., Kubiszewski, I., Giovannini, E., Lovins, H., McGlade, J., Pickett, K. E., ... & Wilkinson, R. (2014). Development: Time to leave GDP behind. *Nature*, 505(7483), 283-285.

Bleys, B. (2012). Beyond GDP: Classifying alternative measures for progress. *Social indicators research*, 109(3), 355-376.

Exercise: Small groups of students will use longitudinal datasets provided by the instructors to compare and contrast GDP with alternative measures of development (where alternative measures (Human Development Index, Social Progress Index, Happy Planet Index, Gross National Happiness Index, etc.). Based on their exploration of the data, **small groups** must develop a list of pros and cons of using alternative measures as well as a summary of whether and how policy decisions would be different if based on these alternative measures.

Evaluation: Lab assignment 1 (1 min video) and participation

Learning Outcomes Met:

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales

- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability

LAB 4 – Work, Well-Being, and Consumption

Preparation: Listen to assigned Ezra Klein podcast with James Suzman:

<https://www.nytimes.com/2021/06/29/opinion/ezra-klein-podcast-james-suzman.html>

Watch the 21 hours video by NEF: <https://www.youtube.com/watch?v=580Vyl6hFmo>

After listening to, and viewing, the assigned podcast and video, individual students must submit three points of agreement and three points with which they disagree. Students must also submit three discussion questions.

Exercise: Based on materials submitted by the students, students will start in **small groups** discussing perspectives on work and employment in our society and the relationship between work, consumption, and sustainability. Student groups will link their arguments to the 12 foundational pillars for the course paying special attention to *time, systems thinking, tradeoffs, the business drivers of sustainability, externalities, individual vs structural change, governance, power and inequality, and social dilemmas*. Student groups will discuss the implications of changes to normal work structures in our society.

Class discussion: Each group will summarize and present their discussion, which will precipitate a full class discussion

Evaluation: Lab assignment 2 (discussion questions) and participation in discussion

Learning Outcomes Met:

- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability

LAB 5 – Systems thinking and Sustainable transportation

Preparation: Read the following

<https://mahb.stanford.edu/blog/systems-thinking-can-help-build-sustainable-world-beginning-conversation/>

Smith, T. (2011). Using critical systems thinking to foster an integrated approach to sustainability: A proposal for development practitioners. *Environment, development, and sustainability*, 13(1), 1-17.

and **Submit homework #2** on CO2 emissions related transportation and driving behavior

Exercise: Small groups of students will discuss and critically evaluate responses to homework and link responses to the 12 foundational pillars for the course, paying special attention to *systems thinking, technology and efficiency vs behavioral change, externalities, time, tradeoffs, and individual vs structural change, and governance, power, and inequality*. Small groups must then pick one of three modes of transportation for which they use data to calculate CO2 emissions for Ohio residents and outline the tradeoffs associated with increasing the use of those modes of transportation: (i) electric vehicles, (ii) airplanes, (iii) rail (light and long-distance)

Evaluation: Participation in discussion

Learning Outcomes Met:

- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Describe how a scientific approach is important to examine the connections, tradeoffs, and synergies across environmental, economic, and social components that are involved in achieving sustainability goals
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales

LAB 6 – Economic Valuation and Natural Capital

Preparation: Read report on Economic Value of Natural Areas in Ohio and view the YouTube video "How are countries Doing Natural Capital Accounting?"

<https://aede.osu.edu/https%3A/aede.osu.edu/faculty-outreach/economic-value-natural-areas-ohio>

<https://www.youtube.com/watch?v=sg-xu31Emws>

Exercise: During the lab, individual students will use the data provided in Carmen to value natural capital on campus (e.g., the Olentangy river corridor, grassed common areas, trees, retention ponds and water courses). The lab will include instructions on how to use a worksheet to value natural capital. In addition to valuing natural capital, students will be asked to consider a set of policy scenarios that change infrastructure on campus. They will be asked to evaluate the tradeoffs associated with the policy scenarios in terms of key university outputs (e.g., improvements to educational opportunities), environmental outputs as measured by natural capital, and social and equity outputs. Students will present the results of their analysis to the whole lab section and discuss the results.

Evaluation: Lab assignment 3 (written answers submitted at the end of the section) and participation in discussion

Learning Outcomes Met:

- Describe a how a scientific approach is important for examining the connections, tradeoffs, and synergies across environmental, economic, and social components that are involved in achieving sustainability goals
- Demonstrate an appreciation of how ecosystem function changes in response to human and nonhuman influences, how humans use and impact ecosystem services, and the implications of these human-environment interactions for sustainability
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales

LAB 7 – Tradeoffs and Ecosystem Services

Preparation:

Read the following

McGraw-Hill Environmental Case Study: “Sharing the Klamath”

Section 1.3 on pages 1-61 to 1-68, including table 1.3-1 of US Department of Interior, Bureau of Reclamation. 2012. Benefit Cost and Regional Economic Development. Technical Report for the Secretarial Determination on Whether to Remove Four Dams on the Klamath River in California and Oregon

News article from the High Country News (Aug, 27, 2021): Klamath River issues explained. https://www.hcn.org/articles/klamath-basin-confused-about-whats-happening-on-the-klamath-heres-a-rundown/print_view

News article from Sacramento News and Review (June, 29, 2021): <https://sacramento.newsreview.com/2021/06/29/hopes-for-imperiled-fish-rise-as-ferc-approves-transfer-of-klamath-river-dam-license/>

Submit homework #3 on tradeoffs over ecosystem services in the Klamath Basin.

Exercise: The homework will prepare students for the multi-attribute utility theory (MAUT) exercise that we will conduct during the laboratory session. The objective of the exercise is to show students how MAUT can be used effectively to identify opportunities for improved social outcomes when difficult and contentious tradeoffs exist between groups. We will focus on surface water allocation and removal of four dams in the upper part of the basin. Students were assigned a specific role when they did their homework (farmer, sport angler, commercial fishery, Native American in tribe with historical rights, and Audubon society member from Portland, Oregon), and they will work with other students in their role. Students will answer a series of questions about their objectives, their views on the outcomes associated with removing the dams, and how they rank the outcomes. The instructor will use the resulting information to quantify a preferred outcome or set of preferred outcomes based on the results. Students will then discuss, as a class, and critically evaluate

whether dams should be removed based on this assessment. The final discussion will include additional review of other approaches to collaborative decision-making.

Evaluation: Participation in lab work and discussion

Learning Outcomes Met:

- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability

LAB 8 – Life-cycle assessment

Preparation: Read the following

Chapters 1 and 2 in Shaked, S., Crettaz, P., Saade-Sbeih, M., Jolliet, O. and Jolliet, A., 2015. *Environmental life cycle assessment*. CRC Press. (Pp. 1-21)

Hoogmartens, R., Van Passel, S., Van Acker, K. and Dubois, M., 2014. Bridging the gap between LCA, LCC and CBA as sustainability assessment tools. *Environmental Impact Assessment Review*, 48, pp.27-33.

Exercise: Small groups will be assigned one of three products (ethanol, cardboard boxes, red meat) and spend the first part of the lab working in their groups researching the product on the internet to find information on the life-cycle effects on carbon-equivalent emissions. **Small groups** will then discuss how life-cycle analysis can be used to influence consumption decisions, supply chain decisions, or policies that society adopts. Each group will present the results of their analysis and discussion to the rest of the group.

Evaluation: Lab assignment 4 (life cycle analysis submission) and participation in discussion.

Learning Outcomes Met:

- Recall and critically assess various depictions, definitions, and conceptualizations of sustainability, sustainable development, and resilience.
- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level

LAB 9 – Metrics for corporate sustainability

Preparation:



Read

Bernow, S., J. Godsall, B. Klempner, and C. Merten. 2019. More than values: The value-based sustainability reporting that investors want. McKinsey and Company. <https://www.mckinsey.com/business-functions/sustainability/our-insights/more-than-values-the-value-based-sustainability-reporting-that-investors-want>

2020 Business and ESG Report for The Coca-Cola Company.

<https://d1io3yog0oux5.cloudfront.net/cocacolacompany/files/pages/cocacolacompany/db/761/description/coca-cola-business-environmental-social-governance-report-2020+%28%29.pdf>

Submit homework #4 on the Coca-Cola company corporate sustainability report (note that the specific company report will be rotated from year to year).

Exercise: In lab, students will evaluate the sustainability criteria/metrics that Coca-Cola reported and used. **Small groups** will work with each other to answer a series of questions about various outcomes in the report. The questions will ask students to report back on several pros and cons associated with each outcome or measurement. We will select a range sustainability goals, i.e., those that address equity and inclusion as well as environmental stewardship and students will be required to address pros and cons of each of them. Each group will then report out to the whole group for broader discussion.

Evaluation: Participation in discussion

Learning Outcomes Met:

- Recall and critically assess various depictions, definitions, and conceptualizations of sustainability, sustainable development, and resilience.
- Describe how a scientific approach is important to examine the connections, tradeoffs, and synergies across environmental, economic, and social components that are involved in achieving sustainability goals
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level

LAB 10 – Indigenous rights, climate change, and REDD+

Preparation: Read assigned articles, which supplement the reading and videos for lecture.

Referring to these papers as well as lecture material on payments for ecosystem services, create a list of three pros and three cons of using REDD+ as a tool for carbon sequestration as well as three discussion questions.

Barbier, E. B., & Tesfaw, A. T. (2012). Can REDD+ save the forest? The role of payments and tenure. *Forests*, 3(4), 881-895.

Newton, P., Oldekop, J. A., Brodnig, G., Karna, B. K., & Agrawal, A. (2016). Carbon, biodiversity, and livelihoods in forest commons: synergies, trade-offs, and implications for REDD+. *Environmental Research Letters*, 11(4), 044017.

Andersson, K. P., Smith, S. M., Alston, L. J., Duchelle, A. E., Mwangi, E., Larson, A. M., ... & Wong, G. Y. (2018). Wealth and the distribution of benefits from tropical forests: Implications for REDD+. *Land use policy*, 72, 510-522.

Exercise: Based on the assigned materials and written submissions, **small groups** will discuss the pros and cons of REDD+ and link this approach with the 12 foundational pillars for the class, playing special attention to *governance, power and inequality, systems thinking, and tradeoffs*. **Small groups** will then use data to calculate the impact on CO₂ levels and future climate change for one of three proposed strategies: (i) carbon sequestration through large-scale afforestation and forest management efforts (like REDD+), (ii) solar geoengineering, and (iii) technologically based carbon capture and sequestration. Each group will present their calculations and the class will discuss each approach.

Evaluation: Lab assignment 5 (pros and cons list and discussion questions) and participation in discussion

Learning Outcomes Met:

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Describe how a scientific approach is important to examine the connections, tradeoffs, and synergies across environmental, economic, and social components that are involved in achieving sustainability goals
- Demonstrate an appreciation of how ecosystem function changes in response to human and nonhuman influences, how humans use and impact ecosystem services, and the implications of these human-environment interactions for sustainability
- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others
- Demonstrate a basic understanding of how organizations, markets, and institutions can help and/or hinder achievement of sustainable actions from the individual level to the societal level
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales

LAB 11 – Critical perspectives on technology for sustainability

Preparation: Submit homework #5 on sustainability innovations. Listen to Ezra Klein Podcast with L.M. Sacasas on the 41 Questions we should ask of the technologies and tools that shape our lives.

<https://www.nytimes.com/2021/08/03/opinion/ezra-klein-podcast-lm-sacasas.html>

Exercise: Each student presents their innovation and associated write-up – students in the online section will submit 2–3-minute videos on Carmen. The class will discuss each innovation that has

been presented in light of the information provided in the podcast above as well as the foundational pillars from class. The class will also critically analyze innovations that have been submitted by previous classes

Evaluation: Homework submission and participation

Learning Outcomes Met:

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Describe how a scientific approach is important to examine the connections, tradeoffs, and synergies across environmental, economic, and social components that are involved in achieving sustainability goals
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales

LAB 12 – Community-based conservation

Preparation: Watch the documentary “Milking the Rhino” (available through university libraries) and write 3 discussion questions.

Exercise: As individuals, students will respond to a set of discussion questions about the film, including ones submitted by their classmates. **Small groups** will then discuss their responses and critically evaluate community-based conservation and eco-tourism as strategies for biodiversity conservation. Groups will be asked to pay special attention to differences in cultural perspectives on wildlife, cross-cultural tensions created by eco-tourism, gender differences in community-level governance and the long-term effects of development. Students will also be asked to think these strategies to the 12 foundational pillars for the course, with a focus on *social dilemmas, systems thinking, tradeoffs, and governance, power and inequality*

Evaluation: Lab assignment 6 (written discussion questions) and participation in discussion

Learning Outcomes Met:

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Demonstrate an appreciation of how ecosystem function changes in response to human and nonhuman influences, how humans use and impact ecosystem services, and the implications of these human-environment interactions for sustainability
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability
- Apply sustainability concepts to evaluate case studies that explore sustainability goals and outcomes of programs or policies at individual, organizational, community, regional, and global scales



LAB 13 – Agriculture, biodiversity, and GMOs

Preparation:

Read

Case Study for Chapter 14 in Duncan, Jancar-Webster, and Switky. 2009. World Politics in the 21st Century. Student Choice Edition. New York: Houghton Mifflin.
http://college.cengage.com/polisci/duncan/world_politics_sce/1e/assets/students/case/duncan_1e_case_ch14.pdf

Lappe, Anna. 2011. The Battle for Biodiversity: Monsanto and Farmers Clash. The Atlantic. March 28 2011.
<http://www.theatlantic.com/health/archive/2011/03/the-battle-for-biodiversity-monsanto-and-farmers-clash/73117/>

Aldhous, P. 2008. Genes for Greens. New Scientist. January 5, 2008
<https://www.newscientist.com/article/mg19726372-900-could-new-gm-crops-please-the-greens/>

Hamblin, J. 2016. The Fading meaning of GMO. The Atlantic.
<https://www.theatlantic.com/science/archive/2016/05/plants-for-the-planet/483132/>

Regis, E. 2019. "The True Story of the Genetically Modified Superfood that Almost Saved Millions" Foreign Policy. October 17, 2019. <https://foreignpolicy.com/2019/10/17/golden-rice-genetically-modified-superfood-almost-saved-millions/#>

Regis, E. 2019. "Golden rice could save children. Until now, governments have barred it." Washington Post. November 11, 2019. <https://www.washingtonpost.com/opinions/2019/11/11/golden-rice-long-an-anti-gmo-target-may-finally-get-chance-help-children/>

Submit homework #6 GMOs, agriculture and biodiversity and re-read assigned articles for homework #6

Exercise: In the laboratory section, students are assigned the role of a particular stakeholder and the background information on that stakeholder. The stakeholder perspectives were assigned for the homework assignment, and students answered questions on the homework from the perspective of the specific stakeholder. Each **small group** (comprised of different stakeholders) will then be assigned as an organization (and NGO, a government regulatory agency, or a company), and each group will have to devise a 25–100-word maximum policy statement about the use of GMOs on Bangladesh rice farms. Each stakeholder must agree with the policy statement. The groups will present their policy statements to the full discussion section and defend them.

Evaluation: Homework submission and participation in discussion

Learning Outcomes Met:

- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Demonstrate an appreciation of how ecosystem function changes in response to human and nonhuman influences, how humans use and impact ecosystem services, and the implications of these human-environment interactions for sustainability

- Discuss their own ethics and values related to sustainability, the obstacles to changing their own behavior, and how those obstacles might apply to others

LAB 14 – Revisiting our six words for sustainability

Preparation: No assigned materials

Exercise: Students will come to class with their original six words for sustainability assignment submission. Students will determine whether they still agree with their original six-word phrase. Students will have the opportunity to craft a new phrase based on what they have learned throughout the course. In addition, they will write an explanation of 200-400 words about why you chose to keep or change their original phrase. Students will discuss their new phrases and justifications in **small groups** and will be asked to focus on the key aspects of the class that resulted in a new phrase and perspective – or – the reasons that their original phrase aligns with the core material from the class.

Evaluation: Lab assignment 7 (six words revision) and participation in discussion

Learning Outcomes Met:

- Recall and critically assess various depictions, definitions, and conceptualizations of sustainability, sustainable development, and resilience.
- Compare and contrast key concepts and ideas in sustainability, economics, business, ecology and conservation biology, and community and international development.
- Exhibit independent thinking to understand the environmental, economic, and social components and trade-offs of sustainability

GE THEME COURSES

Overview

Courses that are accepted into the General Education (GE) Themes must meet two sets of Expected Learning Outcomes (ELOs): those common for all GE Themes and one set specific to the content of the Theme. This form begins with the criteria common to all themes and has expandable sections relating to each specific theme.

A course may be accepted into more than one Theme if the ELOs for each theme are met. Courses seeking approval for multiple Themes will complete a submission document for each theme. Courses seeking approval as a 4-credit, Integrative Practices course need to complete a similar submission form for the chosen practice. It may be helpful to consult your Director of Undergraduate Studies or appropriate support staff person as you develop and submit your course.

Please enter text in the boxes to describe how your class will meet the ELOs of the Theme to which it applies. Please use language that is clear and concise and that colleagues outside of your discipline will be able to follow. You are encouraged to refer specifically to the syllabus submitted for the course, since the reviewers will also have that document. Because this document will be used in the course review and approval process, you should be as specific as possible, listing concrete activities, specific theories, names of scholars, titles of textbooks etc.

Course subject & number

General Expectations of All Themes

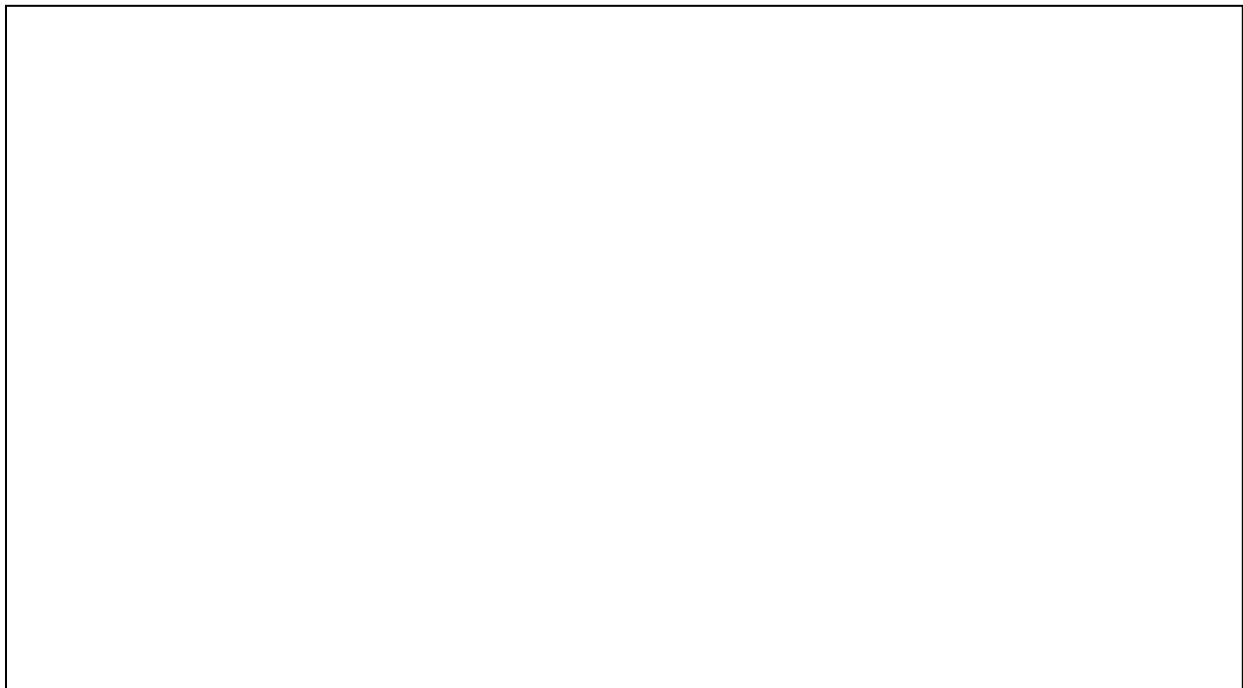
GOAL 1: Successful students will analyze an important topic or idea at a more advanced and in-depth level than the foundations.

Please briefly identify the ways in which this course represents an advanced study of the focal theme. In this context, “advanced” refers to courses that are e.g., synthetic, rely on research or cutting-edge findings, or deeply engage with the subject matter, among other possibilities. *(50-500 words)*

Course subject & number

ELO 1.1 Engage in critical and logical thinking about the topic or idea of the theme. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

ELO 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

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Course subject & number

GOAL 2: Successful students will integrate approaches to the theme by making connections to out-of-classroom experiences with academic knowledge or across disciplines and/or to work they have done in previous classes and that they anticipate doing in future.

ELO 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme.

Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

ELO 2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment, and creative work, building on prior experiences to respond to new and challenging contexts. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met.

(50-700 words)

Course subject & number

Specific Expectations of Courses in Sustainability

GOAL 1: Students analyze and explain how social and natural systems function, interact, and evolve over time; how human wellbeing depends on these interactions; how actions have impacts on subsequent generations and societies globally; and how human values, behaviors, and institutions impact multi-faceted, potential solutions across time.

1.1 Describe elements of the fundamental dependence of humans on Earth and environmental systems and on the resilience of these systems. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course subject & number

1.2 Describe, analyze and critique the roles and impacts of human activity and technology on both human society and the natural world, in the past, currently, and in the future. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

1.3 Devise informed and meaningful responses to problems and arguments in the area of sustainability based on the interpretation of appropriate evidence and an explicit statement of values. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Interdisciplinary Team-Taught Course Inventory

Overview

The GE allows students to take a single, 4+ credit course to satisfy a particular GE Theme requirement if that course includes key practices that are recognized as integrative and high impact. Courses seeking one of these designations need to provide a completed Integrative Practices Inventory at the time of course submission. This will be evaluated with the rest of the course materials (syllabus, Theme Course submission document, etc). Approved Integrative Practices courses will need to participate in assessment both for their Theme category and for their integrative practice.

Please enter text in the boxes below to describe how your class will meet the expectations of Interdisciplinary Team-Taught courses. It may be helpful to consult the Description & Expectations document for this pedagogical practice or to consult your Director of Undergraduate Studies or appropriate support staff person as you complete this Inventory and submit your course.

Please use language that is clear and concise and that colleagues outside of your discipline will be able to follow. You are encouraged to refer specifically to the syllabus submitted for the course, since the reviewers will also have that document. Because this document will be used in the course review and approval process, you should be as specific as possible, listing concrete activities, specific theories, names of scholars, titles of textbooks etc.

Accessibility

If you have a disability and have trouble accessing this document or need to receive it in another format, please reach out to Meg Daly at daly.66@osu.edu or call 614-247-8412.

Pedagogical Practices for Interdisciplinary Team-Taught Courses

Course subject & number

Performance expectations set at appropriately high levels (e.g. Students investigate large, complex problems from multiple disciplinary perspectives). Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Interdisciplinary Team-Taught Course Inventory

Significant investment of time and effort by students over an extended period of time (e.g., engage the issue iteratively, analyzing with various lenses and seeking to construct an integrative synthesis). Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Interactions with faculty and peers about substantive matters including regular, meaningful faculty mentoring and peer support about conducting interdisciplinary inquiry. Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Interdisciplinary Team-Taught Course Inventory

Students will get frequent, timely, and constructive feedback on their work, scaffolding multiple disciplinary perspectives and integrative synthesis to build over time. Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Periodic, structured opportunities to reflect and integrate learning (e. g. students should work to integrate their insights and construct a more comprehensive perspective on the issue). Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Interdisciplinary Team-Taught Course Inventory

Opportunities to discover relevance of learning through real-world applications and the integration of course content to contemporary global issues and contexts. Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Public Demonstration of competence, such as a significant public communication of their integrative analysis of the issue. Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

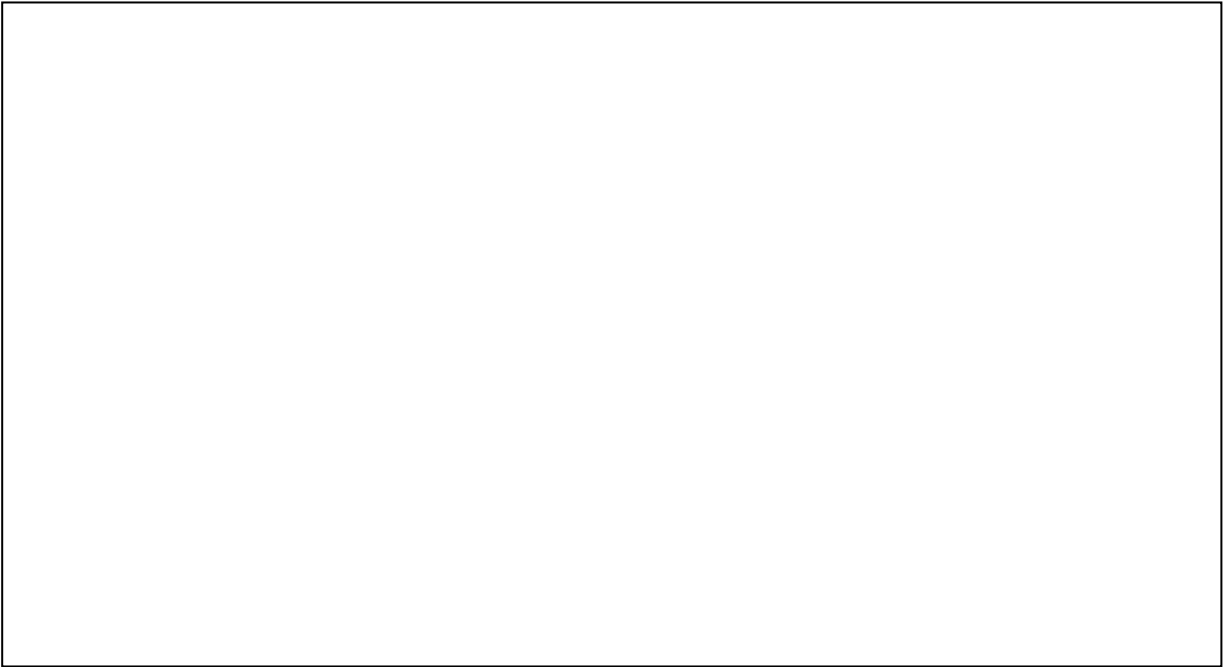
Interdisciplinary Team-Taught Course Inventory

Experiences with diversity wherein students demonstrate intercultural competence and empathy with people and worldview frameworks that may differ from their own. Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Explicit and intentional efforts to promote inclusivity and a sense of belonging and safety for students, e.g. universal design principles, culturally responsive pedagogy, structured development of cultural self-awareness. Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Interdisciplinary Team-Taught Course Inventory

Clear plans to promote this course to a diverse student body and increase enrollment of typically underserved populations of students. Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

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