Term Information

Effective Term	Spring 2024

General Information

Course Bulletin Listing/Subject Area	Evol, Ecology & Organismal Bio
Fiscal Unit/Academic Org	Evolution, Ecology & Org Bio - D0390
College/Academic Group	Arts and Sciences
Level/Career	Undergraduate
Course Number/Catalog	2440
Course Title	Sustainable Oceans
Transcript Abbreviation	Sustain Oceans
Course Description	Oceans are the cradle of life and key to climate, weather, carbon, and water cycling. Critical natural and cultural resources come from humans' interaction with the oceans. This explores the physical and biological features of the earth's oceans, and to identify and explore ways in which humans and the ocean impact one another.
Semester Credit Hours/Units	Fixed: 3

Offering Information

Length Of Course	14 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Lecture
Grade Roster Component	Lecture
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus, Lima, Mansfield, Marion, Newark, Wooster

Prerequisites and Exclusions

Prerequisites/Corequisites	None
Exclusions	None
Electronically Enforced	No

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code	26.1302
Subsidy Level	Baccalaureate Course
Intended Rank	Freshman, Sophomore, Junior, Senior

Requirement/Elective Designation

Sustainability

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

- 1. Describe physical and biological attributes of onshore and offshore marine habitats, and demonstrate understanding of how physical and biological factors connect to one another.
- 2. Describe and analyze the ways in which physical and biological attributes of marine habitats contribute to cultural, political, and economic systems.
- 3. Interpret and critique the intersection of social, physical, and biological dimensions of marine ecosystems.
- 4. Describe and analyze the potential impact of human activities on physical and biological dimensions of marine systems.
- 5. Demonstrate integrity and creativity and/or analytical acumen in synthesizing perspectives on the history or future of physical, cultural, or biological interactions in the ocean.

Content Topic List

- Physical oceanographic processes

  Biological attributes of marine habitats

  Physical attributes of marine habitats

  Natural resources from marine systems

  Human uses of marine systems
- Resiliency and change in physical and biological attributes of marine habitats

Sought Concurrence

No

Attachments

- Marine Bio GE syllabus submission clean.docx: Syllabus

  (Syllabus. Owner: Hamilton,Ian M)
- GE Submission Sustainable Oceans.pdf: GE Submission Form

  (Other Supporting Documentation. Owner: Hamilton,Ian M)
- Ocean Portfolio Project edited.docx: Project example #1

  (Other Supporting Documentation. Owner: Hamilton,Ian M)
- Ocean Region Project edited.docx: Project example #2

  (Other Supporting Documentation. Owner: Hamilton,Ian M)
- EEOB Curriculum Maps Oceans.xlsx: Curriculum Maps

  (Other Supporting Documentation. Owner: Hamilton,Ian M)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Hamilton,Ian M	08/23/2023 04:26 PM	Submitted for Approval
Approved	Hamilton,Ian M	08/23/2023 04:26 PM	Unit Approval
Approved	Vankeerbergen,Bernadette Chantal	09/08/2023 10:52 AM	College Approval
Pending Approval	Jenkins,Mary Ellen Bigler Hanlin,Deborah Kay Hilty,Michael Neff,Jennifer Vankeerbergen,Bernadette Chantal Steele,Rachel Lea	09/08/2023 10:52 AM	ASCCAO Approval

Sustainable Oceans EEOB 2440

Commented [DM1]: Placeholder--using ending # of existing Mar Bio course

Spring 2024
In-class lecture and discussion 90 minutes 2x week
Location
Marymegan (Meg) Daly daly.66@osu.edu
Student Hours Days Times

Our planet is called “earth,” but most of it is covered with water. Oceans are the cradle of life and key to climate, weather, carbon, and water cycling.

This course aims to familiarize you with the physical and biological features of the earth’s oceans, and to identify and explore ways in which humans and the ocean impact one another.

In this course, we will read, view, listen, talk, and create together and independently so that you are able to:

a. Describe physical and biological attributes of onshore and offshore marine habitats, and demonstrate understanding of how physical and biological factors connect to one another.

b. Describe and analyze the ways in which physical and biological attributes of marine habitats contribute to cultural, political, and economic systems.

c. Interpret and critique the intersection of social, physical, and biological dimensions of marine ecosystems.

d. Describe and analyze the potential impact of human activities on physical and biological dimensions of marine systems.

e. Demonstrate integrity and creativity and/or analytical acumen in synthesizing perspectives on the history or future of physical, cultural, or biological interactions in the ocean.

As a GE-Theme course, SUSTAINABLE OCEANS integrates natural and social sciences, requires data literacy, and encourages creativity, exploration, and intersection of disciplinary perspectives. There are no specific disciplinary prerequisites.

We will consider actual and potential interactions between people and the ocean through the lens of **sustainability**, meeting the expected learning outcomes (ELOs) of this GE Theme by understanding the ways that the oceans drive and are driven by intersections between physical, biological, cultural, economic, and political dimensions. Consequently, in this course, in addition to the marine biology focused learning outcomes described above, we will work together to meet the **ELOs of the GE Sustainability Theme**:

> 1.1. Engage in critical and logical thinking about the topic or idea of the theme [Sustainability].
>
> 1.2. Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme [Sustainability].
>
> 2.1. Identify, describe, and synthesize approaches or experiences as they apply to the theme [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 these 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.

Course Policies

Attendance and preparation for class

This is an in-person course. Many of the activities and assignments require you to develop your own understanding and point of view, so it is important that YOU come to class! Power points will be shared via Carmen, but these will not capture all of the content. If you miss class, it is your responsibility to get materials and information from a classmate.

I understand that both personal and professional circumstances might cause time conflicts. Make up work for missed in-class activities may be possible, but may depend on the reason for the absence and the frequency with which you miss class. Absences

that are known in advance and conflict with due dates should be brought to my attention as soon as they are noted so that we can develop a plan for accommodation.

In-class presentations and discussions will presume that you have completed pre-class readings and viewings. Pre-class work is calculated as part of the workload for the course and is required.

Assignments
You will demonstrate your learning in diverse ways. All assignments are out of class submissions via Carmen quiz or an upload to the Carmen dropbox. Due dates are listed on the course calendar, with an expected submission time no later than 11:59 pm Columbus time on the due date. You are expected to complete all assignments. If you have a schedule conflict or an emergency that makes it difficult for you to meet a scheduled deadline, please send me an email as soon as the problem becomes apparent.

My goal is for everyone to have an opportunity to demonstrate their learning. If the default guidelines for time, format, or other details of an assignment do not allow you to do that, please send me an email or speak with me before or after class to develop a plan of action that better supports you. These requests for support must come at least 48 hours before the assignment is due so that we have enough time to modify the circumstances of the assignment.

Quizzes are multiple-choice and T/F questions via Carmen quiz. Each quiz will have an "open window" of completion of 24 hours. You are welcome to use external resources (notes, books, web) to answer the questions, but should not consult other students. Quizzes are TIMED and are one-attempt only. If you encounter a problem using the quiz, you should reach out immediately.

4 quizzes @ 30 points each = 120 points

Final exam, covering all course material (cumulative) will be administered in person during the scheduled final exam time. It will consist of multiple choice, T/F, and short answer questions, and will be open-note with paper notes (no computers or devices).

1 final exam @ 90 points = 90 points

In class activities will occur regularly, consisting of think-pair-share, "google races", and other collaborative responses related to the day's content. You must be present in class to participate in these activities. If you miss one of these activities because you had a schedule conflict with class that day, you should email me to get make-up instructions.

6 in-class activities @10 points each = 60 points

Pre-class activities are short responses related to viewings and readings assigned as pre-class materials. Not that the deadlines for these are the end of day BEFORE class, not the day of class.

4 pre-class activities @10 points each = 40 points

Special projects allow you to do a deep dive on specific aspects of the course content and to explore the connection between course materials and your personal, academic, and professional interests. These can be done collaboratively or independently, with expectations for collaboration provided on each assignment. The larger assignments are scaffolded across multiple weeks with intermediate deadlines that allow peer-review and revision. Assignment guidelines are posted to Carmen, under the Assignments tab.

2 Ocean and You Reflections @20 points each = 40 points
Ocean Regions project @ 100 points= 100 points
Ocean Portfolio project @50 points= 50 points

Grades

The course assignments are collectively worth 500 points. Your final grade is based on the total points earned:

A	500-460	C	381-355
A-	459-440	C-	354-340
B+	439-430	D+	339- 330
B	429-405	D	329-290
B-	404-390	E	289-00
C+	389-382		

Students who do not submit work or attend class may receive a grade of EN. Students who have unexpected circumstances complicate their completion of the course should reach out to me as soon as the problem becomes apparent so we can make a plan.

Extra credit and remedial work

You will have an opportunity to “make-up” points on quizzes and long-form assignments. In the one week following the release of grades, you can increase your score via revision or additional work. Make-up instructions will be posted to Carmen when the assignments are graded/returned. This window of opportunity will not be extended except by prior arrangement—for example, if you have a known schedule conflict, are ill the week the make-up window is open, etc. You can only “make up” assignments that you have submitted. There is no “extra credit” outside of this opportunity to demonstrate mastery on the required work.

Assigned Readings

There is no textbook for this class. Instead, you will be assigned video presentations and readings to support your learning. Some of these will be accompanied by explicit

assignments that ask for recall or reflection on the material presented. Others will be read or watched “on background,” so that you are prepared for the discussion and presentation in class. Readings and videos are listed on the class schedule or will be shared as part of an assignment.

All PDFs will be available through the “Readings” tab in Carmen; videos will be available as a link in the module for that topic and set of class meetings. Readings marked with an asterisk have a pre-class assignment associated with them.

*Ocean Optimism

Knowlton, N. (2021). Ocean optimism: moving beyond the obituaries in marine conservation. *Annual Review of Marine Science*, *13*, 479-499.

*Currents, weather, climate

Palter, J. B. (2015). The role of the Gulf Stream in European climate. *Annual Review of Marine Science*, *7*, 113-137.

Zonation

Peterson, C. H. (1991). Intertidal zonation of marine invertebrates in sand and mud. *American Scientist*, *79*(3), 236-249.

Changing Coral Reefs (you will be assigned to read one of these articles and will share an overview with classmates in class)

Graham, N. A., Cinner, J. E., Norström, A. V., & Nyström, M. (2014). Coral reefs as novel ecosystems: embracing new futures. *Current Opinion in Environmental Sustainability*, *7*, 9-14.

Rinkevich, B. (2014). Rebuilding coral reefs: does active reef restoration lead to sustainable reefs?. *Current Opinion in Environmental Sustainability*, *7*, 28-36.

Pandolfi, J. M., & Kiessling, W. (2014). Gaining insights from past reefs to inform understanding of coral reef response to global climate change. *Current Opinion in Environmental Sustainability*, *7*, 52-58.

Plastics

Mercogliano, R., Avio, C. G., Regoli, F., Anastasio, A., Colavita, G., & Santonicola, S. (2020). Occurrence of microplastics in commercial seafood under the perspective of the human food chain. A review. *Journal of Agricultural and Food Chemistry*, *68*(19), 5296-5301.

Aquaculture (you will be assigned to read one of these articles and will share an overview with classmates in class)

Stentiford, G. D., Bateman, I. J., Hinchliffe, S. J., Bass, D. 1., Hartnell, R., Santos, E. M., ... & Tyler, C. R. (2020). Sustainable aquaculture through the One Health lens. *Nature Food*, *1*(8), 468-474.

Gentry, R.R., Froehlich, H.E., Grimm, D. *et al.* Mapping the global potential for marine aquaculture. *Nature Ecology and Evolution* 1, 1317–1324 (2017).

Free, C.M., Cabral, R.B., Froehlich, H.E. *et al.* Expanding ocean food production under climate change. *Nature* **605**, 490–496 (2022).

*Deep sea mining (will read either Glasby and Van Dover et al. OR Orcutt et al.)

Glasby, G. P. (2000). Lessons learned from deep-sea mining. *Science*, *289*(5479), 551-553.

Van Dover, C. L., Ardron, J. A., Escobar, E., Gianni, M., Gjerde, K. M., Jaeckel, A., ... & Weaver, P. P. E. (2017). Biodiversity loss from deep-sea mining. *Nature Geoscience*, *10*(7), 464-465.

Orcutt, B. N., Bradley, J. A., Brazelton, W. J., Estes, E. R., Goordial, J. M., Huber, J. A., ... & Pachiadaki, M. (2020). Impacts of deep-sea mining on microbial ecosystem services. *Limnology and Oceanography*, *65*(7), 1489-1510.

Climate and Extinction

Penn, J. L., & Deutsch, C. (2022). Avoiding ocean mass extinction from climate warming. *Science*, *376*(6592), 524-526.

Academic Integrity

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

In this class, you will have guidelines on each assignment outlining the ways in which you are allowed to use other people and outside resources. In all cases where external resources or collaboration are allowed, you are expected to acknowledge the sources of ideas, information, and support in your work. Guidelines for those acknowledgements will be provided in the assignment.

If you are struggling and find yourself tempted to cut corners in ways that might violate the code of student conduct, **please reach out**! I have more options for support and grace before you commit misconduct than afterwards and the consequences of academic misconduct proceedings are more substantial than those you would face by turning in late or partially complete work.

Mental Health and Support

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 24/7 by dialing 988 to reach the Suicide and Crisis Lifeline.

Accessibility

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.

Planned schedule of topics

Readings and videos marked with an asterisk (*) have a pre-class assignment associated with them. The readings are available through the Readings tab in Carmen. All assignments are to be uploaded to the Carmen dropbox.

	Date	Topic	Assessments
Intro & expectation sharing	Jan 8	Welcome, Intro to the course	
	Jan 10	The ocean and the human experience	Ocean Optimism reading
	Jan 15	MLK Holiday	
	Jan 17	The ocean and YOU: how different disciplines intersect with marine biology; learning to see the sea	Completed Ocean & YOU assignment
The ocean as an ecosystem	Jan 21	The zones and habitats of the ocean	Looking at the ocean: video 1
	Jan 23	Water is wet: basic physical factors that shape and differentiate these habitats: light, temperature	Zonation Reading
	Jan 28	Water is wet: basic physical factors that shape and differentiate these habitats: currents and salinity	Currents, weather, climate Reading*
	Jan 30	Coastal habitats: basic structure, zonation, key inhabitants	End of week Carmen quiz on physical dimensions of marine systems
	Feb 5	Coastal habitats: key inhabitants and interactions	Zonation reading
	Feb 7	Reefs: basic structure, zonation, key inhabitants	
	Feb 12	Reefs: key inhabitants and interactions	Coral Reefs Reading
	Feb 14	Open ocean: Basic structure, zonation, fish	End of week carmen quiz on nearshore habitats
	Feb 19	Open Ocean: whales (incl whaling industry)	
	Feb 21	Open Ocean: pelagics and plastic	Plastics Reading
	Feb 26	Deep benthos: basic structure, key inhabitants	
	Feb 28	Deep benthos: hydrothermal communities	Vent video*
	Mar 4	Connections between habitats- onshore to offshore	End of week carmen quiz open ocean habitats (incl deep benthos)
	Mar 6	Connections between habitats- benthic to pelagic	Ocean regions part 1 due

	Mar 11	Spring Break	
	Mar 13	Spring Break	
Human impacts & interventions to manage ecosystems	Mar 18	Food: fisheries	Reflection 2: Oceans and YOU
	Mar 20	Food: fisheries	Fisheries and aquaculture video
	Mar 25	Food: aquaculture	Aquaculture Reading
	Mar 27	Alternative Energy: tidal power, algal oil	Ocean Region Part 2 due
	Apr 1	Resources: mining, oil drilling	Mining Reading*
	Apr 3	Resources: natural products chemistry	Carmen quiz: resources (thru mining and drilling)
	Apr 8	Human impacts on ecosystem: currents and temperature	Venom Colab demo
	Apr 10	Human impacts on ecosystem: nutrients	Ocean Regions Part 3 due
	Apr 15	Human impacts on ecosystem: biodiversity	Gulf Dead zone video
	Apr 17	Ocean optimism revisited	Extinction reading Ocean Regions Part 4 due
	Apr 22	Ocean optimism	Ocean portfolios due Carmen quiz Human impacts

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 seeing 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 EEOB 2440

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)*

This course focuses on a single kind of ecosystem (marine), emphasizing foundational ecological (physical ecology, community and individual interactions, competition, predation, nutrient cycling) and evolutionary (phylogeny, adaptation, extinction) processes. This presumes foundational awareness of these concepts. Furthermore, the emphasis is on comparison of ecosystems, outcomes, and processes across physical and human interaction gradients, rather than description and awareness of the habitats, as might be common in a foundational course on marine biology.

Sustainability is the lens through which the resources and interactions are explored. Human activities and opportunities within marine systems and how those systems respond is the explicit emphasis of the course. The specific examples relate to contemporary issues like deep sea mining, aquaculture, and natural resource extraction/discovery in marine systems.

Students are assigned readings primarily from the scientific secondary literature--opinions and reviews intended for a scientific rather than general audience. These all make scientific arguments and most include explicit discussion of data (with figures). Primary literature is generally inaccessible to a GE audience and is typically narrower than appropriate for the goals of this class.

Course subject & number **EEOB 2440**

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)

The first half of the course emphasizes various marine ecosystems, considering natural resilience in the biological and physical aspects of these habitats. Students will compare habitats and the ways humans interact with them. In the last half of the course, students will focus on ways in which humans use marine resources, considering the impacts and consequences of those uses on humans, the ecosystems, and the ecosystem inhabitants.

In class activities will include comparisons between habitats, brain storming sessions on human/marine system interactions, and debates about consequences of specific interactions

The Ocean Regions project (attached) asks each student to consider human impacts and interactions within a specific habitat. In the final part of this multi-stage project, students are asked to research and summarize how humans are directly impacting their focal region and the species within it. Per the assignment guidelines, each of the topics below should be its own short paragraph.

a. Summarize how humans are directly impacting your region and the species in it. (15 points)
b. Speculate what it your region will be like 30-40 years from now, given current projections of climate change (15 points)
c. Describe efforts to protect or regulate your habitat and describe/ imagine what additional actions could be taken (15 points)
d. Provide at least one reference and direct quote from an outside source (not provided to you by course materials) that you have researched. This should be cited. (3 points)

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)*

In addition to the approaches described for ELO 1.1, students will read opinion, review, and research articles relevant to the course focus. They will be asked in class or via pre-class assignments to comment on the nature and strength of the evidence included in the piece, to describe the findings, and to compare and contrast the perspective and findings of the pieces they read with other works , in conversation with their classmates.

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)*

In the second half of the course, we will consider human interactions with marine systems and the consequences of these interactions for humans and the ecosystems and their inhabitants. Students will be assessed via carmen quizes on their understanding of the consequences of e.g., fisheries, aquaculture, natural resource extraction, tidal harnessing, on the communities of animals and humans using those ecosystems. They will complete readings on these topics. The impacts of these kinds of uses on a specific habitat is part of the "Ocean Region" project described above—that assignment elicits more focused consideration of a single habitat, versus consideration of a process and its impacts across multiple habitats.

The individual student experience with marine resources will be solicited through assigned reflections and in in-class discussions about the diversity of ways in which humans use marine resources.

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)

Students will begin and end the class with a paper calling for ocean optimism, and will engage in discussion and reflection about their own optimism and understanding of the sustainability and future of marine resources (via the final exam). They will identify ways in which their experiences and goals connect to marine systems and resources, and will be asked (as part of various assignments) to identify their contributions and challenges in collaborating and in engaging with the scientific literature.

The Ocean Portfolio assignment invites them to use their creativity and personal interests to showcase a habitat feature or organism. This builds from their Ocean Region assignment, allowing them to choose key aspects of their focal region to showcase through an infographic, poster, or other kind of presentation format. Students will have the option to share those on the last day of class.

Course subject & number **EEOB 2440**

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)*

Students will learn about the impact of the ocean on climate, weather, and nutrient cycling. They will explore how these will change under different scenarios of climate change or resource extraction. Their understanding will be assessed through carmen quizzes, the final exam, and various assignments. There is a reading explicitly connecting physical ocean systems with the habitability of Europe, and we will begin with a discussion of human reliance on the oceans for practical and cultural reasons.

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)*

The last half of the course explores human use of the oceans. They will learn about extractive processes (fishing, mining, etc) and about enrichment processes (nutrification, aquaculture). We will consider technologies for energy generation, desalination, and natural products discovery. They will be asked to consider the consequences of these on their focal environment and to compare and contrast where possible (for example, environmental consequences of fishing vs aquaculture). Assessment will be though carmen quizzes, the final exam, and in the portfolio and ocean regions projects.

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)*

In the first three quizzes and on the final exam, students will consider the ways in which climate change and resource use perturb physical and biological factors within habitats. In the fourth quiz and on the finale exam, students will be asked to consider the challenges and benefits of various human uses of ocean resources, identifying in what contexts possible uses are a benefit and in what context those uses represent a challenge. The emphasis in the final will be on intersecting the challenges, benefits, and intersections of physical, biological, and human impacts.

The Ocean Mining readings will be presented in a classroom discussion around proposed changes to the international laws, with students reflecting (in a mandatory in-class experience) on their perspective on the proposed actions. Students will integrate in-class presentations, discussions, and their own readings as they consider the issue.

The class begins and ends with a reading calling for "Ocean Optimism." In their (required) in-class response to this reading, students will identify an issue they have concern about, indicate what they learned, and then reflect on what causes they have for optimism and what causes they have for concern.

Ocean Portfolio

The organisms of the ocean and all the ways they relate to each other and their environment set important parameters on the resources and resilience of oceans. You will highlight these by creating 8 by 11 information page/brochures for three (3) organisms in your habitat. These can be plants, animals, microbes, etc. You should choose organisms that are resonant to you or that exemplify a process or circumstance that is of particular interest to you.

This assignment can be done collaboratively, in groups of up to three participants. If you choose to work in a group, please know that all members of a group will do confidential evaluations of the contributions of the members to determine whether they deserve full credit (the same grade) for their contribution.

This assignment should be submitted via the Carmen Dropbox on April 22, 2023. The submission should include all three fact sheets, the curation statement, and the collaboration statement with works cited.

Assignment guidelines

Each fact-sheet should summarize in your own words how the organism eats, where/how it lives within the habitat, key features that support its survival in this ecosystem, and if/how humans or human activities directly or indirectly affect them. You're encouraged to make these as appealing and as creative as you want. If you have alternative ideas for how to approach this (rather than a fact-sheet), please see me no later than 10 days before the due date to get approval for an alternative format.

Each fact sheet should:

- have an image (or images) (**1 points**)
- include information about where the organism lives (**1 points**)
- list its scientific name (**1 point**)
- identify key attributes of the organism (**5 points**)
- highlight the ways that humans interact with these species (**4 points**)
- be visually appealing and clearly organized (**3 points**)

In addition to the three fact sheets, you will submit a short "curation statement" that describes the rationale behind the choice of your three focal organisms. This must be logically organized and grammatically correct and explain/address all three chosen species. It can be as short as a few sentences and need not be longer than a paragraph. The statement is worth 5 points.

Collaboration guidelines

At the end of the rationale, you should include an explicit summary of all works consulted and acknowledge the contributions of anyone who helped you develop your portfolio. Please remember to include sources for images used! The acknowledgement should list the name of the person and what they contributed (i.e., Meg Daly provided suggestions for citations and commented on a draft of this portfolio; Sylvia Earle drew the pictures of sharks, etc.). Works cited should list websites, books, journal articles, and other resources, with a full citation (APA or similar citation for books or journals and full URL and date of access for web resources).

If you use generative AI engines for aspects of the project, your approach should be documented in the "works consulted" section by indicating the prompt used and the ways in which the result was edited and refined so that it meets the criteria of being the result of your creative process and in your own words.

If you have collaborated with classmates on this work, you should share those names in the acknowledgements. A brief, confidential survey will be sent to all group members. Completing that survey will be required for the submission to be graded.

Ocean Region Project

Each of you will undertake in-depth study of a specific habitat and the impacts of human activities on it. This will be a multi-part assignment, with due dates for each segment listed on Carmen and with each sub-part below. Through this work, you will each become experts on some aspects of the marine ecosystem. Multiple students will be focusing on the same habitat and will be drawn together to share their findings and then develop final products to share with the class.

Each phase of this assignment has specific guidelines and due dates. The opportunities for collaboration differ in each phase. Each phase of the work should be submitted via the Carmen Dropbox.

For this multi-phase project, you will start by choosing a region of the ocean. There will be a limit to each zone – numbers will be drawn and you will be allowed to choose in that order.

- Intertidal Zone
- Estuaries/Mangroves
- Sandy shores
- Coral Reefs
- Epipelagic Zone
- Deep Ocean benthos
- Hydrothermal vents

Part 1: Read and outline your assigned readings (a chapter from a textbook), making a list of main ideas, terms and topics.

This phase is worth 15 points and is due March 6, 2024. It is individual work. You will get feedback and a draft grade, with an opportunity to revise. The final versions will be shared among all students who are working on the same habitat.

Part 2: Work collaboratively with the other students working on the same habitat to develop a shared study guide for the class on this habitat. This study guide should identify key physical and biological attributes of the habitat, signature biological interactions, focal human interactions within the habitat, aspects of the habitat that offer resilience for ocean ecosystems, and aspects of the habitat that are sensitive or threatened.

In addition to the study guide, please write and turn in a reflection on this process, answering the questions below. The reflection can be a one to a few sentence reply to each question or a paragraph-style narrative—your choice.

a. Identify one piece of information was included in another person's outline not included in yours. Was this not included in your chapter or not emphasized?

b. How did your habitat working group decide what to include in the study sheet? What is one advantage to this strategy? One disadvantage?

c. What do you think you contributed to the group effort?

What aspect of working in the group was frustrating for you?

This phase is worth 15 points (10 points for the study guide and 5 points for the reflection). Both are due March 27, 2024.

Part 3: Write 10 multiple choice questions and 4 short response questions about the topics in the chapter. You can draw on materials from class, too. Include the page numbers or lecture slides (slide/date) where the answer is found. These questions will be shared as a study guide and will be part of the text bank for the final.

Format note: You will use a standard template for these so that the formatting is consistent across student/submissions. The template will be on Carmen. You should *make a copy*, rename the file so its identifiably yours, and then type in your own information.

This phase is worth 32 points and is due April 10, 2024. This phase of the work can be done in collaboration in a team of as many as 4 students. If you collaborate with classmates on this phase, there will be a brief, confidential survey sent to all group members to evaluate individual contributions. Completing that survey will be required for the submission to be graded.

Part 4: Research and summarize how humans are directly impacting your focal region and the species within it. Your writing should be a minimum of one page (at least 500 words). Each of the topics below should be its own short paragraph.

a. Summarize how humans are directly impacting your region and the species in it. (15 points)
b. Speculate what it your region will be like 30-40 years from now, given current projections of climate change (15 points)
c. Describe efforts to protect or regulate your habitat and describe/ imagine what additional actions could be taken (15 points)
d. Provide at least one reference and direct quote from an outside source (not provided to you by course materials) that you have researched. This should be cited. (3 points)

This phase of the work is worth 48 points and is due April 17, 2024. This is individual work. If you use generative AI engines for aspects of the project, your approach should be documented in the "works consulted" section by indicating the prompt used and the ways in which the result was edited and refined so that it meets the criteria of being the result of your creative process and in your own words. In addition, you should include an explicit summary of all works consulted and acknowledge the contributions of anyone who helped you. The acknowledgement should list the name of the person and what they contributed (i.e., Meg Daly provided suggestions for citations and commented on a draft of this portfolio). Works cited should list websites, books, journal articles, and other resources, with a full citation (APA or similar citation for books or journals and full URL and date of access for web resources).