

Marine Biology and Ocean Sustainability

BIOL 4290 / BIOL 5290 - Fall 2026 Syllabus

University of North Texas | Department of Biological Sciences | Denton, Texas 76203

Course	BIOL 4290 / 5290 - Marine Biology and Ocean Sustainability
Section / CRN	001 CRE (44915) / CRE (45091)
Term	Fall 2026
Meeting time	Tuesday evenings, 5:30-8:20 pm
Location	ENV 115 - in-person class
Instructor	Associate Professor: Dr. Ione Hunt Von Herbing, Ph.D.
Director	Marine Conservation and Aquatic Physiology Laboratory
Office	Biology Department, LSCA 253
Phone	940-565-3595
Email	vonherbing@unt.edu ; ione.huntvonherbing@unt.edu
Office hours	Tuesdays 3:00-5:00 pm, or by appointment. Students are strongly encouraged to email their questions or concerns first <u>before</u> scheduling a Zoom appointment if necessary.

Required Textbook

Jeffrey S. Levinton. Marine Biology: Function, Biodiversity and Ecology. 6th edition. Oxford University Press, 2022. **E-book required.**

Students are responsible for assigned readings from the required e-book, as well as additional readings, journal articles, scientific reports, agency resources, or other materials posted on Canvas.

Course Web Page, Canvas, and Email

Canvas will be used for course announcements, readings, lecture materials, the Learning with AI microcredential badge assignment, presentation paper approval, the student presentation paper bank, grade posting, and schedule updates. Students are responsible for checking Canvas regularly.

Midterm and final exams will be submitted by university email as Microsoft Word files, following the exam submission instructions below. Students should not submit exams through Canvas unless the instructor gives specific written permission to do so.

This syllabus, including the lecture schedule and assignments, is subject to change. Any changes will be announced in class and posted on Canvas.

Course Description

Marine Biology and Ocean Sustainability examines the living ocean as a dynamic biological, physical, and social-ecological system. The course introduces major marine habitats, organisms, ecological processes, environmental gradients, and adaptations, while emphasizing how climate change, fisheries, aquaculture, pollution, biodiversity loss, and conservation shape the future of the ocean.

Students will study marine organisms and ecosystems in a global context, with attention to the physical and chemical features of the marine environment, including temperature, salinity, oxygen, pH, ocean circulation, productivity, and habitat diversity. The course also emphasizes sustainability challenges such as fisheries, mariculture/aquaculture, plastic pollution, coral reef decline, marine protected areas, climate impacts, and deep-sea conservation.

A new component of the course introduces responsible use of artificial intelligence as part of scientific and ocean-literacy training. AI will be treated as a tool for questioning, organizing, and critiquing information - not as a scientific authority or substitute for reading, evidence, reasoning, or original analysis.

Prerequisites

Eight hours each of biology and chemistry. This course may not be repeated at the graduate level.

Course Learning Objectives

1. Explain major biological, physical, and chemical features of marine environments.
2. Describe the diversity, function, and adaptation of marine organisms across major habitats.
3. Evaluate how climate change, pollution, fisheries, aquaculture, and human activity affect marine ecosystems.
4. Interpret marine biology and ocean sustainability claims using scientific evidence.
5. Communicate a peer-reviewed marine science topic clearly in oral and written form.
6. Distinguish between scientific evidence, public claims, opinion, and unsupported assertions.
7. Use artificial intelligence tools responsibly, when permitted, by providing context, checking claims, disclosing use, and verifying information against reliable sources.

Course Procedure and Attendance

This course meets once per week for approximately three hours in the evening. Class meetings will include lecture, discussion, student presentations, evidence-based activities, and occasional short in-class exercises.

Attendance is expected at all class meetings. Because this is a once-per-week evening course, missing one class means missing a substantial amount of material. Students are responsible for all lecture material, readings, handouts, Canvas materials, presentations, discussions, and announcements.

The instructor assumes that students want to learn and are willing to work in order to learn. Learning at the college level requires focused reading, review of lecture notes, active listening, participation in discussion, and assimilation of course material.

Artificial Intelligence Use and AI Literacy

This course includes a basic introduction to the responsible use of artificial intelligence tools in marine biology and ocean sustainability. Students are not required to have a paid AI account, and no assignment will require access to a premium AI tool.

AI tools may be used only when explicitly permitted by the instructor or by the assignment instructions. When permitted, AI may be used for brainstorming, organizing notes, generating study questions, improving grammar or clarity, comparing explanations, or identifying claims that need verification. AI may not be used as a scientific source, and AI output may not substitute for reading, reasoning, interpretation, or original analysis.

Students are responsible for the accuracy, originality, interpretation, and citation of all submitted work. Any AI-generated factual claim must be checked against reliable scientific sources, such as the textbook, assigned readings, peer-reviewed papers, or reputable scientific agencies.

AI may not be used to generate exam answers unless an assignment specifically instructs students to use and critique AI output. Unauthorized or undisclosed AI use may be treated as an academic integrity concern.

When AI is used in submitted work, students must include a brief disclosure explaining how it was used. Example:

"I used ChatGPT/Copilot/another AI tool to help brainstorm possible presentation questions and organize my outline. I checked all factual claims against the assigned paper and other scientific sources. The final interpretation and writing are my own."

In this course, AI will be treated as a tool for inquiry and critique, not as an authority.

No paid AI account is required for this course.

Students Who Choose Not to Use AI Tools

Students are not required to use generative AI tools to produce their own writing, analysis, exam answers, presentations, or scientific interpretations in this course. Some students may choose not to use AI tools for ethical, environmental, privacy, accessibility, personal, or academic reasons. That choice will be respected.

However, all students are expected to develop basic AI literacy because AI-generated information is increasingly present in academic, scientific, public, and professional settings. Students may therefore be asked to learn about AI, and evaluate AI-generated claims.

No paid AI account is required for this course.

Learning with AI Microcredential

Students will complete UNT's Learning with AI: Critical Literacy for College Students microcredential as part of this course. The microcredential is free for UNT students, faculty, and staff and is offered online, asynchronously, and self-paced. No prior experience with artificial intelligence is required.

The purpose of including this microcredential is to give all students a shared foundation in responsible, ethical, and effective use of generative AI. Students will learn basic principles of how generative AI works, how to write more effective prompts, how to evaluate AI responses, and how to recognize ethical and safety issues such as academic integrity, bias, and data privacy.

Completion of the microcredential does not mean that AI may be used freely on all course assignments. AI use in this course remains governed by the assignment instructions and the course AI policy. AI may not be used as a scientific source or as a substitute for reading, reasoning, evidence, or original analysis. Completing the microcredential does not require students to use AI to generate their own submitted work for this course. Its purpose is to build critical AI literacy, not to require dependence on AI tools.

Students must submit proof of completion titled **Learning with AI Microcredential Badge** on Canvas by Tuesday, September 22, 2026. Acceptable proof may include a digital badge, certificate, PDF, screenshot, or other documentation showing completion. This assignment is worth 10 points.

Students should keep a copy of their completion badge or certificate for their own records. If Canvas upload problems occur, students should contact the instructor before the deadline.

The link to the microcredential is found here - <https://digitalstrategy.unt.edu/microcredentials/learning-with-ai.html>

Submission of Course Work

This course will use a hybrid submission system. Canvas will be used for most course logistics, low-stakes assignments, presentation materials, and grade posting. Midterm and final exams will be submitted by university email as Microsoft Word files because the instructor provides detailed markup and comments on the midterm exam.

- **Submit through Canvas:** Learning with AI microcredential badge, presentation paper approval materials, student presentation paper bank posts.
- **Submit by email:** Midterm and final take-home exams, as Microsoft Word files only, following the exam submission instructions below. Exams must be submitted as Microsoft Word files by email to vonherbing@unt.edu unless the instructor gives written permission for another submission method.
- **Do not submit by email unless instructed**

Exams and Grades

The course will use a 100-point grade structure rather than weighted Canvas assignment groups. The points below add up to 100 points. Exams will consist primarily of short-answer and long-answer essay questions and will be based on lectures, readings, lecture notes, handouts, journal articles, student presentations, and class discussions.

Undergraduate Grading

Course component	Points
Learning with AI microcredential badge (Due Sept. 22)	10
Midterm take-home exam	25
Final take-home synthesis exam	35
Individual marine evidence Oral presentation	20
AI-evidence audit appendix as final slide for presentation	5
Attendance and participation	5
Total	100

Graduate Grading

Course component	Points
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Learning with AI microcredential badge (Due Sept. 22)	10
Midterm take-home exam	25
Final take-home synthesis exam	35
Individual marine evidence Oral presentation	20
AI-evidence audit appendix as final slide for presentation	5
Graduate synthesis essay	10
Attendance and participation	5
Total	110

Grading Scale

Final numerical averages will be used to determine final letter grades: A = 90-100; B = 80-89; C = 70-79; D = 60-69; F = below 60.

The instructor reserves the right to adjust grade cutoffs downward if appropriate, based on the distribution of grades and overall course performance. Grade cutoffs will not be raised above the scale listed above.

Midterm and Final Exams

The midterm and final exams will be take-home essay exams. Students are expected to write independently and to demonstrate their own understanding of marine biology and ocean sustainability. AI may not be used to generate exam answers unless the instructor gives specific written permission for a particular exam question or activity.

The final exam will include material covered after the midterm and broader synthesis questions drawing from the entire course. Some exam questions may include credit for making accurate, relevant connections to student presentations and papers from the Student Presentation Paper Bank.

- **Midterm Exam:** Posted on Canvas Tuesday, October 6, 2026; due Tuesday, October 20, 2026.
- **Final Exam:** Posted on Canvas Tuesday, November 17, 2026; due during the official final exam period, with the exact due date posted on Canvas.

Exam Submission by University Email

Exams must be submitted as Microsoft Word files by email to vonherbing@unt.edu unless the instructor gives written permission for another submission method.

Students must use the following subject line:

- BIOL 4290/5290 Midterm Exam - Last Name, First Name
- BIOL 4290/5290 Final Exam - Last Name, First Name

Exam files must be named as follows:

- LastName_FirstName_MarineBio_Midterm_Fall2026.docx
- LastName_FirstName_MarineBio_Final_Fall2026.docx

Only one exam submission email should be sent unless there is a documented technical problem. The instructor will provide comments and markup on the midterm exam and return the marked Word file to the student. The final exam will be graded, and the final exam mark will be posted in Canvas; final exams will not ordinarily be returned with detailed comments.

AI Use on Midterm and Final Exams

AI tools may not be used to generate, draft, outline, rewrite, or substantially edit answers for the midterm or final exam. Students may use course materials, lecture notes, the textbook, assigned readings, student presentation papers posted in the Canvas Paper Bank, and their own notes when preparing exam answers. However, students may not upload course lectures, exam questions, notes, readings, or presentation materials into an AI tool for the purpose of producing exam answers.

The purpose of the take-home exams is to evaluate each student's own understanding, synthesis, interpretation, and written explanation of marine biology and ocean sustainability. Exam answers should reflect the student's own thinking and should use course material accurately.

Permitted uses for exams: normal word processing, spell check, grammar check, and editing for clarity that does not generate substantive content.

Not permitted: using AI to create an answer, summarize course materials into an answer, generate examples, produce citations, rewrite paragraphs, or develop the argument of an exam response.

Students may be asked to briefly explain or discuss their exam answers if there is a concern about authorship, accuracy, or academic integrity.

A short exam certification statement is required for each take-home exam.

Exam Authorship Statement for Exams

I certify that the answers submitted in this exam are my own work. I used course materials, lecture notes, assigned readings, and my own notes, but I did not use artificial intelligence tools to generate, draft, outline, rewrite, or substantially edit my exam answers. I understand that unauthorized AI use on exams may be treated as an academic integrity violation.

Name: _____

Date: _____

Marine Evidence Oral Presentation and AI/evidence audit appendix

Each student will prepare and deliver an individual 10–12 minute presentation based on a peer-reviewed scientific paper, major marine sustainability issue, or evidence-based ocean case study relevant to the course.

Topics may include fisheries, aquaculture, coral reefs, marine mammals, seabirds, deep-sea ecosystems, ocean acidification, climate change, pollution, marine protected areas, harmful algal blooms, bycatch, marine plastics, or other approved topics in marine biology and ocean sustainability.

Presentations will normally take place during the final portion of class meetings. No more than four individual presentations will be scheduled during a single class period. Presentations will begin early enough in the semester to accommodate the class enrollment.

Each presentation should include:

1. Scientific background and context.
2. The major question, problem, or hypothesis addressed by the selected paper or case study.
3. The main scientific evidence and findings.
4. Biological and ocean-sustainability relevance.
5. Limitations, uncertainty, or competing interpretations.
6. One question for class discussion.

Students should be prepared to answer brief questions about their selected paper, evidence, and interpretation.

Each student will provide as the last slide in the oral presentation an Individual Evidence Brief / AI-Evidence Appendix associated with the presentation. The purpose of this assignment is to document the scientific evidence used in preparing the presentation and, where applicable, how AI tools were used, checked, corrected, or rejected. The evidence brief will be graded individually.

After the paper is approved, students are responsible for posting the full citation, DOI or stable link, and PDF if appropriate in the Canvas Student Presentation Paper Bank. The Paper Bank will serve as the shared class reference library for student presentations and may be used by classmates when preparing for the midterm and final exams.

A presentation paper is not considered available to the class until it has been posted in the Student Presentation Paper Bank. Students should check the Paper Bank regularly and are expected to listen respectfully and take notes during class presentations.

AI / Evidence Audit Component

As part of the course, each student will complete a short AI/evidence audit connected to their presentation and posted as the last slide in the presentation. The purpose is to help students understand that AI tools can generate plausible-sounding information that may be accurate, misleading, incomplete, outdated, or unsupported.

The AI/evidence audit appendix should briefly identify:

1. The topic or claim evaluated.
2. Whether the student used AI directly or worked from an instructor-provided AI passage.
3. Three factual claims that required checking.
4. The scientific sources used to check those claims.
5. One sentence explaining what required human scientific judgment.

Graduate Synthesis Essay

Graduate students will submit an additional essay, approximately 5 pages, on an approved topic in marine science, marine biology, or ocean sustainability. The essay may be related to the oral presentation but must go beyond the presentation by developing a deeper synthesis, critique, or research-informed argument.

Graduate essays should use peer-reviewed literature and should demonstrate graduate-level understanding of scientific evidence, uncertainty, and significance.

Make-Up Work

Make-up exams or extensions may be granted in documented cases of serious illness, death in the family, jury duty, university-approved activities, or other significant circumstances. Students should contact the instructor as soon as possible if such circumstances arise.

Routine scheduling conflicts, travel plans, work conflicts, social events, car trouble, or failure to manage deadlines will not ordinarily justify make-up work unless accompanied by significant documented circumstances.

Class Etiquette

Class meetings are intended for lecture, discussion, questions, student presentations, and respectful engagement with marine biology and ocean sustainability topics. Students are encouraged to ask questions. There are no stupid questions.

Private conversations, disruptive technology use, repeated interruptions, or disrespectful behavior interfere with the ability of other students to learn and may result in removal from class for that meeting. Students are expected to listen respectfully to classmates during presentations and discussions.

Academic Integrity

Students are expected to follow UNT academic integrity policies. All submitted work must be the student's own work unless collaboration is explicitly allowed. Students must properly cite sources and must disclose any permitted AI use.

Unauthorized collaboration, plagiarism, fabrication of sources, use of AI to generate unauthorized exam answers, or submission of work not produced by the student may be treated as academic misconduct.

Accessibility and Accommodation

The University of North Texas makes reasonable accommodation for students with disabilities. Students needing reasonable academic accommodations must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the student will request their letter of accommodation. ODA will provide faculty with a reasonable accommodation letter via email to begin a private discussion regarding a student's specific

needs in a course. Students may request reasonable accommodations at any time, however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to meet with faculty regarding their accommodations during office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website.

Student Athletes and University-Sponsored Activities

Students participating in university-sponsored activities, including athletics, should notify the instructor early in the semester of any anticipated conflicts. Students are responsible for communicating in advance and for completing all course work.

Lecture Schedule and Outline

The instructor reserves the right to change course content, readings, presentation dates, and case studies as needed. Reading assignments are a general guide; additional readings and resources may be posted on Canvas.

Part One: The Living Ocean, Evidence, and Sustainability

Week 1 - Aug. 18

Introduction to Marine Biology and Ocean Sustainability. Course overview; what is marine biology; what is ocean sustainability; the ocean as a living system; expectations for lecture, exams, presentations, participation, Canvas, and email exam submission. Reading: Levinton, Chs. 1 & 21.

Responsible AI use in a science course; the Learning with AI microcredential; Link to microcredential site - <https://digitalstrategy.unt.edu/microcredentials/learning-with-ai.html>

Week 2 - Aug. 25

Global Fisheries, Aquaculture, and Seafood Systems. Fisheries, mariculture/aquaculture, food systems, sustainability tradeoffs, and the problem of simple narratives. Reading: Levinton, Chs. 1 & 21 and assigned materials.

More on AI microcredential: AI is not a source; prompt context; verification; disclosure; scientific evidence versus public claims.

Week 3 - Sept. 1 (Presentations can begin)

Fisheries/Aquaculture Sustainability and the Public Ocean. The class will also introduce fisheries, aquaculture, seafood systems, and sustainability tradeoffs. Students will practice evaluating marine sustainability claims using scientific evidence. Chs. 1 & 21.

Week 4 - Sept. 8

The Ocean as a Biological and Physical System. Ocean basins, seawater, circulation, productivity, gradients, and the relationship between physical structure and biological life. Reading: Levinton, Chs. 2-5.

Part Two: Ocean Environments and Climate Change

Week 5 - Sept. 15

Oceanic Environment I: Temperature, Salinity, Oxygen, and pH. Environmental gradients and biological constraints; how organisms experience the marine environment. Chs. 2-5

Week 6 - Sept. 22

Oceanic Environment II: Paleohistory, Ocean Physics, and Climate Context. Ocean history, currents, circulation, and the physical basis of climate impacts. Learning with AI microcredential badge due. Chs. 2-5

Week 7 - Sept. 29

Climate Change and the Oceans I. Warming, marine heatwaves, stratification, oxygen loss, acidification, and biological responses. Chs. 2-5

Week 8 - Oct. 6

Climate Change and the Oceans II: Thresholds, Adaptation, and Vulnerability. Adaptation, acclimation, range shifts, phenology, and species vulnerability. Midterm exam posted on Canvas. Chs. 2-5

Part Three: Marine Ecosystems Under Stress

Week 9 - Oct. 13

Marine Pollution, Plastics, and the Pacific Garbage Patch. Plastic pollution, contaminants, open-ocean accumulation, food-web concerns, and public narratives about pollution. Chs. 10 & 17

Week 10 - Oct. 20

Coral Reef Ecosystems and Climate Stress. Coral biology, symbiosis, bleaching, reef biodiversity, reef decline, and restoration debates. Midterm exam due to vonherbing@unt.edu email as a Word file. Chs. 10 & 17

Week 11 - Oct. 27

Coastal Ecosystems, Estuaries, Kelp Forests, and Habitat Change. Nursery habitats, coastal productivity, habitat degradation, restoration, and ecosystem services. Chs. 10 & 17

Part Four: Marine Vertebrates and Adaptations to the Marine Environment

Week 12 - Nov. 3

Marine Fishes and Physiological Adaptation. Fish diversity, functional morphology, osmoregulation, temperature, oxygen, pH, growth, energetics, and sustainability relevance. Ch. 9.

Week 13 - Nov. 10

Seabirds, Marine Mammals, and Conservation Conflict. Marine vertebrate adaptations, migration, feeding ecology, conservation, fisheries interactions, and human-wildlife conflict. Chs. 18 & 20.

Week 14 - Nov. 17

The Deep Sea, Bioluminescence, and Unknown Oceans. Deep-sea habitats, pressure, darkness, bioluminescence, hydrothermal vents, deep-sea biodiversity, and deep-sea mining. Final exam posted on Canvas. Final scheduled presentations. Chs. 18 & 20

Thanksgiving Break - Nov. 23-29

No class during Thanksgiving Break.

Week 15 - Dec. 1

Future Ocean Synthesis: What Would a Sustainable Ocean Require? Course synthesis; evidence-based sustainability; student presentation overflow if needed.

Final Exam

Final take-home exam due by university email on December 8, 2026 as a Word file during the official final exam period.