

BIOL 388: Marine Biology

SYLLABUS

SUNY Geneseo
Fall, 2019

Course Description. Students in this course will dive into the biology of marine life, from tidepools to trenches. Course themes include the vast diversity of marine organisms, adaptations to distinct marine environments, and human impacts on marine systems. Students will also learn methods in marine research and conduct a literature review and presentation on a topic of their choosing. *Prerequisites: BIOL 117, BIOL 119, BIOL 203.* 3 credits.

Course Meetings.

Monday, Wednesday, Friday 10:30 – 11:20 am ISC 115

Learning Outcomes. During this course, we will:

- Explore the biodiversity of marine systems across broad taxonomic and habitat ranges.
- Understand adaptation into the marine environment at molecular, organismal, and community levels.
- Develop and practice strategies for reading and critiquing scientific journal articles.
- Engage in critical thinking and discussions about human impacts on marine systems.
- Research, synthesize, and present scientific information effectively through written and oral projects.

Instructor. Dr. Mackenzie Gerringer ISC 255 gerringer@geneseo.edu

Office Hours: Mon. 2:00–4:00 pm, Wed. 1:30–2:30 pm, and By Appointment

Office hours are your time for getting questions answered, course expectations clarified, advise on pursuing research opportunities or careers in marine biology and more. Please email me (gerringer@geneseo.edu) or chat before/after class if you have questions or would like to set up a meeting outside of office hours.

Materials. *Textbook: Marine Biology: Function, Biodiversity, Ecology.* Jeffrey Levinton, 5th Edition, 2017. Older editions may also be used. There is a copy available on four-hour reserve in Milne Library. Corresponding readings for lecture topics are provided in the schedule.

Scientific Papers. We will also explore current research in marine biology. These five readings are available on Canvas. Article response worksheets will help you develop strategies for reading scientific papers. Please submit these article responses for three of the five readings. For one reading, we will also have a mini-journal club to discuss the studies, questions we come across, and what we'd do next to advance the field.

Course Technology. Additional materials will always be available on Canvas for those looking to dive deeper into these topics. We have discussion threads for questions about the course, material, or research opportunities. If you see internship opportunities or neat marine science news, please

share! We will also be learning and using some common tools for accessing and analyzing marine data, including R. All software will be freely available to download, with links provided on Canvas.

Assignments & Grades. Course grades will be based on participation in class, reading responses, projects, and exams, designed to be inclusive for different learning styles and help you track your progress. Assignment summaries are included below, with further assignment details provided on Canvas and in class throughout the semester. Please feel free to reach out if there are questions about grading policies and course expectations.

Article Responses. 15%. Five scientific journal articles will supplement the textbook reading. For three of these, write a short response on the worksheet provided (*10 points each*). For one other article, meet with the instructor in groups of three for a short (~15 min) journal club discussion on the reading (*15 points*).

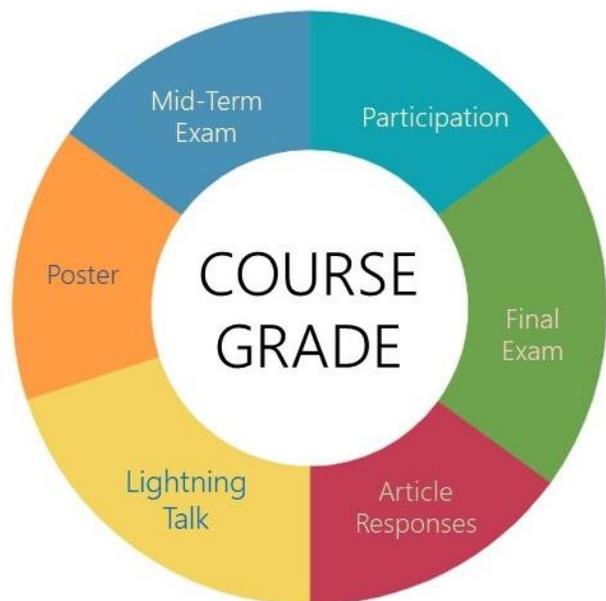
Lightning Talk. 20%. Prepare a four-minute lightning talk on a topic in marine biology that excites you. Submit a topic proposal (*15 points*) and a presentation outline (*15 points*) for feedback. Talks will be given in class, 11/4–11/8 (*30 points*). Slides are due via Canvas at 9 am on 11/4.

Human Impacts Poster. 15%. How will you share your marine science expertise beyond the classroom? Create an eye-catching, informative poster to communicate one human impact on marine systems to a public audience. You may work individually or in pairs. For individuals, please cite three scientific sources, for pairs, use six sources (*45 points*).

Exams. Exams will be closed-book covering the material presented in class, with short-answer and short essay questions. *Mid-Term, 15%.* The mid-term exam will be held on Monday, October 7th (*45 pts*). *Final, 20%.* The final exam will be held on Friday, December 13th, 3:30–6:00 pm (*60 pts*). We will have open review sessions in class before each exam.

Participation. 15%. You'll earn full participation credit by engaging with in class activities and discussions (*45 points*). Asking questions, sharing your insights during class discussions, and posting on Canvas discussions are all ways to actively participate in this course.

Course Policies. *Attendance* is expected in this course. *Late assignments* and make-up assignments will be accepted only with extenuating circumstances. If you have an emergency or



foresee a scheduling conflict on an assignment exam, please contact me as soon as possible and we'll work something out on a case-by-case basis.

Resources. Further readings, activities, career and internship opportunities will be available on the Canvas page. Please check the course page for these resources and do not hesitate to reach out if you have questions about the material or want to know more about a topic.

Useful Links for Marine Science.

Review of Latitude & Longitude: <https://www.thoughtco.com/latitude-and-longitude-1433521>
Real-Time Visualization of Winds and Currents: <https://earth.nullschool.net/>
National Data Buoy Center Resources: <http://www.vos.noaa.gov/mwl.shtml>
The Argo Float Network: http://www.aoml.noaa.gov/phod/argo/how_argo_works.php
NOAA *Okeanos Explorer* Live Feed <https://oceanexplorer.noaa.gov/livestreams/welcome.html>
Ocean Networks Canada, Data and Resources: <http://www.oceannetworks.ca/>
Ocean Observatories Initiative: <https://oceanobservatories.org/>
Hawaii Ocean Time Series, 30 years of Oceanographic Data: <http://hahana.soest.hawaii.edu/hot/>
Understanding Climate Change: <http://www.realclimate.org/>
<https://data.giss.nasa.gov/gistemp/news/>

Disability Support. It is crucial that all students in this class have access to the full range of learning experiences. The university maintains a policy and practice to create inclusive and accessible learning environments consistent with federal and state law. Full participation in this course requires the following types of engagement:

Lecture: the ability to attend lectures and discussion sessions of 50 minutes three times a week with up to 35 other students.

SUNY Geneseo will make reasonable accommodations for persons with documented physical, emotional, or cognitive disabilities. Accommodations will be made for medical conditions related to pregnancy or parenting.

Roles & Responsibilities. Student: inform the instructor no later than the first week of the quarter of any accommodation(s) you will or may potentially require.

Instructor: maintain strict confidentiality of any student's disability and accommodations; support all students to meet the learning objectives of this course.

Requests for accommodations including letters or review of existing accommodations should be directed to the Office of Disability Services in Erwin Hall 22 or disabilityservices@geneseo.edu or 585-245-5112. Students with letters of accommodations should submit a letter to each faculty member at the beginning of the semester and discuss specific arrangements. If you anticipate or experience barriers to your learning or full participation in this course based on a physical, learning, or mental health disability, please immediately contact the instructor to discuss possible accommodation(s). Additional information on the Office of Disability Services is available at www.geneseo.edu/dean_office/disability_services.

Well-Being. Student well-being is prioritized in this class. Concerns about academic performance, health situations, family health and wellness (including the loss of a loved one), interpersonal

relationships and commitments, and other factors can contribute to stress. Students are strongly encouraged to communicate their needs to faculty and staff and seek support if they are experiencing unmanageable stress or are having difficulties with daily functioning. The Dean of Students (585-245-5706) can assist and provide direction to appropriate campus resources. For more information, see www.geneseo.edu/dean_students.

Mental Health. As a student, you may experience a range of challenges that can impact your mental health and thus impact your learning; common examples include increased anxiety, shifts in mood, strained relationships, difficulties related to substance use, trouble concentrating, and lack of motivation, among many others. These experiences may reduce your ability to participate fully in daily activities and affect your academic performance.

SUNY Geneseo offers free, confidential counseling for students at the Lauderdale Center for Student Health and Counseling, and seeking support for your mental health can be key to your success at college. You can learn more about the various mental health services available on campus at health.geneseo.edu.

Academic Support Services. Beyond office hours, the campus provides a range of support services to help students thrive in their classes. These services include:

- Tutoring, both drop-in and by-appointment, with student tutors in the Writing Learning Center, the Math Learning Center, and a range of department-based tutoring centers
- Online tutoring through the SUNY-wide STAR-NY system (www.starny.org/tutoring_schedule)
- Supplemental Instruction, in which trained student assistants review lecture material from specific classes

Information on times and locations is available through the Center for Academic Excellence website at www.geneseo.edu/library/center-academic-excellence.

Library Research Help. Milne Library has an award-winning staff trained in finding the best information. They have created online research guides, self-help databases, and are available for individual consultation. Research Librarians are available for walk-in consultations and students may request appointments with staff experts in particular fields. Full information on Milne Library research resources, hours, and consultation options is available at www.geneseo.edu/library/ask-us.

Academic Integrity and Plagiarism. Students may discuss the concepts together, but each student must submit their own, original work. Milne Library offers frequent workshops to help students understand how to paraphrase, quote, and cite outside sources properly. These sessions are meant to educate about the importance of using original ideas and language, and how to incorporate paraphrases and quotes into writing. The complete list of library workshops can be found at www.geneseo.edu/library/library-workshops.

Academic dishonesty includes cheating, knowingly providing false information, plagiarizing, and any other form of academic misrepresentation and are serious violations of the student code of conduct. College policies and procedures regarding academic dishonesty are available at www.geneseo.edu/handbook/academic-dishonesty-policy.

Computer and Technology Support. For assistance with your computer or mobile device, visit the CIT HelpDesk in Milne Library. CIT provides self-help guides on a range of computer issues,

including access to the campus network, Canvas, printing, software guides, and other resources. The CIT Self Help Guides at wiki.geneseo.edu/display/cit/CIT+Self+Help can be helpful in finding quick solutions to basic technology issues.

CIT also provides free access to over 7,500 online tutorials for software, digital tools, web development, programming, and design through [linkedin.com/learning](https://www.linkedin.com/learning).

Food Security for SUNY Geneseo Students. SUNY Geneseo students who find themselves in a position of food insecurity and do not have the financial resources to support their food and nutrition needs can access the Geneseo Groveland Food Pantry located at the First Presbyterian Church, 31 Center Street in Geneseo. Students can utilize the pantry once with no referral or contact with the College. At this visit they will be provided items that will address their basic needs for several days. If a student continues to face difficulties providing for their own nutritional needs beyond their first visit to the pantry they should connect with Susan Romano, Director of Financial Aid to receive a brief letter that they will present to the staff at the pantry that verifies their need. If students do not have a FAFSA on file for any reason they should contact Dr. Leonard Sancilio, Dean of Students, to discuss their particular situation and options. The Geneseo Groveland Food Pantry is open on the following days and times:

Tuesday: 10:00 am – 2:00 pm

Wednesday: 4:00 pm – 6:30 pm

Thursday: 10:00 am – 2:00 pm

If you have any questions please contact Dr. Leonard Sancilio, Dean of Students at: sancilio@geneseo.edu or 585-245-5706.

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SCHEDULE

Week 1

Aug. 26	Course Introduction	
Aug. 28	The Oceans	
Aug. 30	The Oceans: Properties of Seawater	Ch. 2

Week 2

Sept. 2	<i>Labor Day, No Classes</i>	
Sept. 4	The Oceans: Currents, Waves, & Tides	
Sept. 6	A Brief History of Marine Biology, Lightning Talk Expectations	Ch. 1

Week 3

Sept. 9	Methods of Marine Research	
Sept. 11	Marine Ecology	Ch. 4
Sept. 13	Productivity & Food Webs	Ch. 12

Due: Article Response, *Choy et al. 2017*, Food Webs

Week 4

Sept. 16	Changing Oceans	<i>IPCC Report Summary</i>
Sept. 18	Climate Change Impacts on Marine Systems	Ch. 3
Sept. 20	<u>Discussion:</u> Climate Change & Ecoanxiety	

Due: Discussion Questions

Week 5

Sept. 23	Marine Organisms: Microbes	
	<u>Guest Lecture</u> , Dr. Logan Peoples	
Sept. 25	Marine Organisms: Zooplankton	Ch. 8
Sept. 27	Marine Organisms: Invertebrates	Ch. 14

Due: Lightning Talk Topic Proposals

Week 6

Sept. 30	Marine Organisms: Fishes	
Oct. 2	Marine Organisms: Mammals, Birds, & Reptiles	Ch. 9
Oct. 4	Mid-Term Review	

Due: Article Response, *Steinberg & Landry 2017*, Zooplankton

Week 7

Oct. 7	Mid-Term Exam	
Oct. 9	<u>Activity:</u> Organismal Adaptation, <i>Bring Laptops to Class</i>	
Oct. 11	Benthic Ecology	Ch. 15

Due: Mid-Term Evaluations

Week 8

Oct. 14	<i>Fall Break, No Classes</i>	
Oct. 16	Pelagic Ecology	Ch. 10
Oct. 18	Habitat Highlight: The Intertidal	Ch. 16

Week 9

Oct. 21	Habitat Highlight: Coral Reefs	Ch. 17
	Due: Lightning Talk Outlines	
Oct. 23	Habitat Highlight: Seagrasses, Kelp Forests, & Mangroves	Ch. 13
Oct. 25	Habitat Highlight: The Deep Sea	Ch. 18

Week 10

Oct. 28	Habitat Highlight: Polar Seas	Ch. 19
	<u>Guest Lecture</u> , Dr. Isidro Bosch	
Oct. 30	Reproduction, Life History, & Growth	Ch. 7
Nov. 1	Movement of Marine Organisms	
	Due: Article Response, <i>Dingle & Drake 2007</i> , Migration	

Week 11

Nov. 4	Lightning Talks	
	Due: All Lightning Talk Slides, submit to Canvas by 9 am	
Nov. 6	Lightning Talks	
Nov. 8	Lightning Talks	

Week 12

Nov. 11	Human Impacts on the Marine Environment	Ch. 22
Nov. 13	Marine Biodiversity & Conservation	Ch. 20
Nov. 15	<u>Activity:</u> Biogeography & Biodiversity in R, <i>Bring Laptops to Class</i>	

Week 13

Nov. 18	Marine Physiology: Salinity & Oxygen	Ch. 5
Nov. 20	Marine Physiology: Temperature & Pressure	
Nov. 22	Marine Physiology: Light & Vision	Ch. 11
	Due: Article Response, <i>Marshall 2017</i> , Vision	

Week 14

Nov. 25	<u>Activity:</u> Seasonality in the Seas, <i>Bring Laptops to Class</i>	
	Due: Humans & the Marine Environment Posters	
Nov. 27-29	<i>Thanksgiving Break, No Classes</i>	

Week 15

Dec. 2	Fluid Dynamics & Marine Organisms	Ch. 6
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Dec. 4 Life in a Fluid Medium cont.

Dec. 6 Sound in the Sea

Due: Article Response, *Popper & Hawkins 2018*, Bioacoustics

Week 16

Dec. 9 Putting it Together: Final Review

Dec. 10 Study Day, *Extended Office Hours*

Dec. 13 **Final Exam, 3:30–6 pm**