



Ceiba Foundation for Tropical Conservation TROPICAL CONSERVATION SEMESTER

MARINE BIOLOGY of COASTAL & REEF ECOSYSTEMS (4 credits; UW Zoo 400)

Instructors

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Course webpage (in Canvas)

<https://canvas.instructure.com/register> and use a join code that will be given to you in class. Create a username and password the first time you access the page, and then edit your profile. Be sure the time zone is set to Central Time!

Purpose of the Course

The marine realm occupies some 70% of the Earth's surface, yet receives little attention in most ecology courses. This course aims to introduce you to the field of marine biology, and provides an overview of physical oceanography, energy and food webs, selective pressures and evolutionary responses, major taxonomic groups of organisms, and the ecological communities found in marine ecosystems. This course also will give you the opportunity to practice field research techniques used in marine studies, and carry out your own investigation. Finally, together with the marine portion of Conservation Biology, we will examine the many challenges faced by marine systems, including providing food for much of the planet, and the conservation approaches being employed to overcome them.

Learning Objectives:

- Describe the basic physical and chemical properties of seawater.
- Describe the geomorphology of oceans and how conditions change with depth.
- Explain the causes of waves, tides, and global ocean circulation patterns and their impact on climate.
- Understand how abiotic conditions in the oceans influence the biotic communities within them.
- Identify and describe the distinguishing characteristics of major marine animal taxa.
- Describe how Galapagos islands were formed and identify major flora and fauna found there.
- Describe the ecological characteristics of marine ecosystems and explain the biotic adaptations to them.
- Demonstrate command of common marine sampling and research techniques.
- Articulate major threats to ocean ecosystems and actions that can be taken to mitigate them.
- Apply ecological concepts in marine science to the design of marine protected areas.

Course Expectations & Grading

The Coastal & Marine Ecosystems course combines classroom lectures, field study of marine natural history, and hands-on research projects in marine science. We expect you to take initiative above and beyond the minimum requirements. **Participation** scores are based on student involvement and interaction during classroom and field activities, input in group discussions, inquisitiveness and engagement in learning, respect and helpfulness towards others, and overall contribution to the success of the course. **Homework assignments** will include several field activities, collecting marine data underwater, and an island-by-island set of Galapagos Natural History questions to be completed during the weeklong boat voyage. Each student must also keep a **field journal** that should be considered a permanent record of sites visited, natural history notes, species lists, daily observations and reflections, and data collected.

Students will work in pairs or small groups to conduct an observational **research project** while in Galapagos on a topic of their interest. The project will provide preliminary observations and data that will form the basis of a research or conservation proposal. The purpose of the projects is to gain experience in conducting research in marine ecology, to apply concepts and methods learned during the course, and to learn the essentials of grant writing. Students will give an **oral presentation** of their preliminary findings, and produce a written proposal as part of the project grade. The **final exam** will be composed of a field portion and a written portion made up of short answer and brief essay questions. Your grade breakdown and major due dates are as follows:

Grade Item	Due Date	Weight
Participation (includes discussion and peer review)		15%
Assignments		15%
Field Exam (in Galapagos)	Thu. 4/12	15%
Written Exam (in Quito)	Wed. 4/18	15%
Project (written, oral)		
Preliminary research proposals (final draft)	Fri. 4/6	5%
Proposal rough draft	Mon. 4/16	
Final proposal	Fri. 4/20	15%
Oral presentations	Fri. 4/20	10%
Field Journal including datasets	Wed. 4/18	10%

Grading Scale*: A=100-92%, AB=91.9-88.0%, B=87.9-82.0, BC=81.9-78.0, C=77.9-70.0, D≤69.9*Please note the USFQ online grade system only displays whole letter grades; your actual final grade will appear correctly on your transcript from UW-Madison.

Required Texts

Readings will be assigned out of the books below. Additional articles will also be assigned as required reading and are accessible via the course website (see above).

Jackson, M.H. 1994. *Galapagos, A Natural History Guide*. University of Calgary Press.

Castro, P. and M. Huber 2016. *Marine Biology (10th edition)*. McGraw Hill Education.

Additional Course Materials:

Textbook readings are shown on the online course calendar. Other required readings, handouts and other course materials (web links, syllabi, etc.) can be accessed on the course webpage.

Online course materials are for **your use only**. Please do not share the course website or password with people outside the program.

Lecture Topics (see *tcsdocs* website for detailed schedule):

- Introduction to Oceans
- Marine Food Webs
- Fish Ecology
- Fish Biology and Identification
- Marine Invertebrates
- Intertidal Zones
- Mangroves, Seagrass Beds, and Estuaries
- Introduction to Galapagos
- *Fisheries
- Seabirds
- Coral Reefs
- *Marine Threats: Pollution and Eutrophication
- *Marine Threats: Climate Change
- *Marine Conservation Approaches
- Pinnipeds
- Sharks & Rays
- Sea Turtles
- Cetaceans
- *Marine Reserves & Restoration
- Abyssal Environments
- *Marine Protected Areas