



Ceiba Foundation for Tropical Conservation
TROPICAL CONSERVATION SEMESTER
Spring Semester 2017

TROPICAL ECOLOGY II: COASTAL & MARINE ECOSYSTEMS (4 cr.)
March 1 – April 14

Instructors:

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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 (mangrove, coral reefs, rocky intertidal zones, etc.) 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

Marine biology combines classroom lectures, study of marine natural history through site visits, structured field activities designed to teach field methods for marine research, and a partially self-directed small group scientific research project. 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 projects, 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 notebook** 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. 4/6	15%
Written Exam (in Quito)	Wed. 4/12	15%
Project (written, oral)		
Preliminary research proposals (final draft)	Fri. 3/31	5%
Proposal rough draft	Mon. 4/10	
Final proposal	Fri. 4/14	15%
Oral presentations	Fri. 4/14	5%
Field Notebook including datasets	Fri. 4/14	15%

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 documents website (see below).

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

Nybakken, J.W. and Bertness, M.D. 2005. *Marine Biology: An Ecological Approach (6th edition)*. Pearson / Benjamin Cummings Press, San Francisco.

Additional Course Materials:

Textbook readings are shown on the syllabus. Other required readings, handouts and other course materials (web links, syllabi, etc.) will be posted on the course website: <http://www.ceiba.org/tcsdocs>

These materials are for your use only. Please do not share your username or password with people outside the program. To access the files:

Login: **tcs2017**
Password: **tcs2017**

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