

BI 410/510 TROPICAL MARINE BIOLOGY – FALL 2016

Professor Michelle Wood,

475 Onyx Bridge (Above Science Library)

Office Hours Friday 11-12:30 (and by appointment)

NOTE: EXCEPT WEEK 1 - Thursday 11-12:30

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The tropical marine environment includes some of the most spectacular, diverse, and threatened marine ecosystems on Earth. This class is intended to provide advanced understanding of the structure and function of coral reef ecosystems and the biology of the major reef builders and eroders – plus a few of the just plain ‘cool’ animals you will find on reefs and adjacent ecosystems. Climate change, including increased water temperatures and ocean acidification – along with tremendous human activity on the coasts of tropical nations – represent major stressors through processes like increased siltation, eutrophication, ocean acidification, sea level rise, and thermal stress. These topics will be explored at an advanced level using online resources and primary and secondary literature.



LEARNING OBJECTIVE AND OUTCOMES

Students successfully completing this course will be able to:

- 1) Describe patterns of marine ecology associated with latitude, and reasons that latitude can (and cannot) be used to predict the impact of global change or the distribution of tropical species.
- 2) Locate and explain major bio-regions of the tropics, explain what is meant by “Tropics” and “Tropical”, and defend (or critique) various theories intended to explain patterns of marine biodiversity throughout the tropics.
- 3) Be able to compare and contrast the structure and function of the three major marine ecosystems of the tropics – coral reefs, seagrass beds, and mangroves.
- 4) Discuss the role of larval life history phases in the ecology of benthic communities in the tropics, and be able to apply these concepts to issues relating to climate change and conservation.
- 5) Recognize members of major phylogenetic groups in tropical marine ecosystems and predict likely traits and adaptive features by applying knowledge of specific groups studied in class.
- 6) Demonstrate an understanding of different types of symbiosis by using specific examples from tropical marine biology.
- 7) Demonstrate an understanding of the physiology of coral bleaching, the nature of the coral/zooxanthellae symbiosis, the role of larval life history stages in benthic communities of the tropics, the role of key phylogenetic groups, the role of currents and connectivity in maintaining tropical marine ecosystems, and proposed methods of monitoring and predicting the health of coral reefs and other marine ecosystems by being able to interpret scientific literature on these topics.
- 8) Utilize data from IPCC and NRC reports, earth observing systems like Coral Reef Watch, and other sources to explain why climate science is an evolving field and how ocean acidification and sea level rise are affecting tropical marine ecosystems using specific examples.

- 9) Interpret and analyze scientific literature, including graphical information – using both written and oral communication effectively.
- 10) Demonstrate an ability to read using a constructively critical and skeptic approach by being able to write professional-level peer reviews.
- 11) Articulate an understanding of how science and scientific careers progress by reflecting on how your idea about your own future has changed over the term as a result of information shared by visiting scholars discussing their own research.

TEXTBOOKS

- 1) *Coral Reefs: A Very Small Introduction* – Oxford Univ. Press, **UO Bookstore**
- 2) *Tropical Connections*, W. L. Kruczynski and P. J. Fletcher, IAN Press – Chs. 4,5,6 and a small bit of Ch. 7
 - a. Available as e-chapters from www.ian.umces.edu
 - b. Available as a whole e-book from IAN Press
 - c. Available for order a print book on Amazon and from IAN press
 - d. On reserve in Science Library
- 3) SimUText: Climate Change Modeling. You can purchase directly online from SimUlink (info to be provided) or from the bookstore. If you purchase from the bookstore, you will get a voucher with a number you will use to access the online content. Details in box at end of syllabus.

RECOMMENDED:

- 1) *Ocean Acidification, A National Strategy to Meet the Challenges of a Changing Ocean*. Available as a free download at <http://www.nap.edu/catalog/12904/ocean-acidification-a-national-strategy-to-meet-the-challenges-of>
- 2) *Photographic Atlas of Marine Biology* (amazing coverage with excellent phylogenetic context). On reserve in Science Library, available through Amazon.
- 3) *The Biology of Reefs and Reef Organisms*, Walter M. Goldberg, On Reserve in Science Library, available through Amazon

OTHER READINGS WILL BE ASSIGNED DURING THE TERM – SEE CANVAS POSTINGS

COURSE TEACHING PHILOSOPHY AND ROLE OF ONLINE QUIZZES AND MOVIE

ASSIGNMENT. Research has shown that students retain material learned and are more likely to be successful in a course if there are multiple opportunities to apply content, and more opportunities for them to actively participate on classroom settings, rather than simply listen to lectures (no matter how fabulous the lectures). With the exception of introductory lectures, this course is taught from an active learning perspective in which the goal is to use a wide range of approaches and several low-stakes assignments to build confidence and skill in applying the content you are learning to scientific discussion, scientific criticism, analysis of current environmental problems (and the politic and policy surrounding them), and your own career development. Biweekly online quizzes, based on reading assignments and some online video will be graded on an objective point scale and constitute a small part of the overall grade. These, combined with other online assignments, homework assigned to help guide classroom discussion, and participation in the 'mini-labs' on Tuesdays should prepare students for the "final" which is the principal summative assessment of learning and skill development. The group projects represent another significant portion of the grade and are intended to allow students to share their interests in a particular topic, develop skills in collaboration and task management, as well as dive into

a single topic or particular personal interest. Grading and engagement are summarized in the following table:

STUDENT ENGAGEMENT AND ASSESSMENT FOR BI410/510 TROPICAL MARINE BIOLOGY		
EDUCATIONAL ACTIVITY	UNDERGRADUATE HOURS ENGAGED	GRADUATE HOURS ENGAGED
MW classes	28.5	28.5
Tues discussions	13.5	13.5
Friday tutorials	0	10
Online quizzes and films (bi-weekly)	10	12
Readings & written preparation for discussion	30	48
Group geographical presentation prep	4	4
Climate simulation	5	6
Coral Watch Tutorial	5	7
Group Project - overview, bibliography, talk	10.5	10.5
Group Project - individual report	3.5	5.5
Mid-term	5	7.5
Final	5	7.5
TOTAL HOURS	120	160

	UNDERGRADUATE ASSESSMENT (% Final Grade)	GRADUATE ASSESSMENT (% Final Grade)
Online quizzes and films	20	10
Climate Change (75% ontime completion- 33% per day late penalty; 25% graded questions)	10	10
Coral Watch Tutorial (written answers, 33% penalty per day late penalty)	10	10
Group Project (20% annotated bibliography and overview, 5% presentation)	25	25
Individual Reports (due with group reports, 33% per day late)	5	5
Review or proposal	0	10
Final	25	25
Participation and Attendance	5	5
TOTAL PERCENT	100	100

Bi 410 PROJECTS – Tropical Marine Ecology is a very exciting and rapidly developing field, just like the nations that support tropical marine ecosystems and depend on them for food and other forms of security. Ten weeks does not allow us to investigate many specific or individual topics in much detail. Thus, working in teams of 2-4 people, students will choose a topic to explore through the term. Initially the topic may be somewhat broad and the

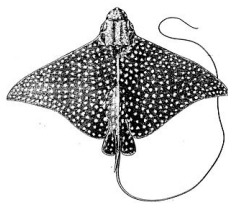
group effort will be graded 50% on an annotated bibliography (and short overview) generated by all group members together, 25% on a group presentation of highlights from the bibliography, and 25% on a short written report that provides more detail on one specific topic from the bibliography. Each student will write their own short written report and turn it in with the annotated bibliography compiled by all members of the group.

BI510 PROJECT & READINGS – Graduate students will do additional readings on a topic of their choosing, and meet to discuss them with the professor each week. Time for this meeting will be determined in Week 1. They will participate in the group projects, as described in the preceding section, but will be expected to write a longer and more thoughtful and thoroughly referenced report than undergraduates, with greater weight on the report and less weight given online quiz and movie assignments. They will also complete an additional writing assignment as agreed upon with the professor during weekly meetings. This might be a set of written reviews of one or two of the papers read in the weekly meetings, a short research paper on a topic of interest not covered by the group project, or other similar effort.

ACADEMIC INTEGRITY: Ideas and creative expression are the cornerstone of the intellectual life of the University. Plagiarism and other forms of dishonesty in the academic endeavor are thus contrary to the goals of the University and an enlightened life, just as personal integrity, collaboration and honest sharing of ideas (with credit given where it is due) is part of the path to new knowledge and a just society. Students are expected to adhere to University policy on academic misconduct and are responsible for consulting with the instructors if they have any questions about proper procedures for attribution, cooperative projects, or other acts that might be construed as plagiarism or other forms of misconduct. It is your responsibility to verify that any action that might be construed as academic misconduct is approved by the instructor BEFORE you take it! So, feel free to ask. Also see guidelines at <http://policies.uoregon.edu/vol-3-administration-student-affairs/ch-1-conduct/student-conduct-code> and information about plagiarism at <http://researchguides.uoregon.edu/citing-plagiarism>.

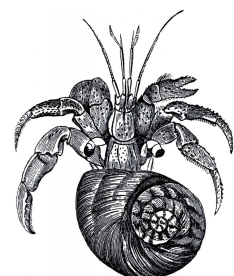
INCLUSIVITY AND ACCESSIBILITY: Freedom of academic inquiry, equity among our entire diverse array of students, and responsiveness to individual needs so that everyone is able to perform at their best are all core values for the UO and the Ocean Planet Team.

Accommodations for documented disabilities will be made most easily if you let us know as soon as possible what accommodations are needed. For some accommodations, you may need register with the Accessible Education Center (<https://aec.uoregon.edu>) but if any aspect of the course is causing difficulty of access for you, please speak to an instructor whether or not you are also working with the AEC. While we cannot all totally understand each other's personal experiences, we can all work to eradicate discrimination and we can all share and benefit from each other's perspectives with respect and generosity. Courtesy and thoughtfulness will enrich our journey together this term, and are expected from everyone.



PROHIBITED DISCRIMINATION AND HARASSMENT REPORTING

In my life, I have experienced various types of discrimination and harassment which has made me thoughtful about the #metoo movement and other changes occurring in our culture. As time passes, I have become particularly determined to try to identify and overcome any implicit bias



or other habits and ideas that might keep me from approaching other people respectfully and as unique individuals with their own tremendous potential and personal worth. I know we all bring our own values, experience, history, and aspirations for kindness and respectfulness into each interaction with another person. We are all different, but hopefully we share the goal that our community should be a place where everyone is free from intimidation, bullying, discrimination or harassment. I will not tolerate uncivil behavior in my classroom. Further, I ask everyone to try to bring their “A” game to class, in terms of stretching their capacity to see another person’s perspective and to leave behind stereotypes we may harbor in our minds. I am a ‘Student Directed” Reporter for sex and gender-based harassment which means that, as long as you are 18 years old or older, I am only required to report incidents of sex or gender based discrimination, harassment, or violence you might share with me if you ask me to.

Official UO Policy: *Any student who has experienced sexual assault, relationship violence, sex or gender-based bullying, stalking, and/or sexual harassment may seek resources and help at safe.uoregon.edu. To get help by phone, a student can also call either the UO’s 24-hour hotline at 541-346-7244 [SAFE], or the non-confidential Title IX Coordinator at 541-346-8136. From the SAFE website, students may also connect to Callisto, a confidential, third-party reporting site that is not a part of the university.*

Students experiencing any other form of prohibited discrimination or harassment can find information at respect.uoregon.edu or aaeo.uoregon.edu or contact the non-confidential AAEO office at 541-346-3123 or the Dean of Students Office at 541-346-3216 for help. As UO policy has different reporting requirements based on the nature of the reported harassment or discrimination, additional information about reporting requirements for discrimination or harassment unrelated to sexual assault, relationship violence, sex or gender based bullying, stalking, and/or sexual harassment is available at [Discrimination & Harassment](#). Specific details about confidentiality of information and reporting obligations of employees can be found at titleix.uoregon.edu

It is important that you review the information below *before* you subscribe to the SimUText for **Tropical Marine Ecology at University of Oregon**. **To avoid possible problems, do not wait until the last minute.**

- CHECK YOUR TECH! Visit <https://simutext.zendesk.com/hc/en-us/categories/200170134-Check-Your-Tech> to confirm that the SimUText application will work on your computer, and/or to explore your options if there is a problem.
- If you purchased a SimUText Voucher from your bookstore, be sure to have it with you when subscribing, as you will need to enter your voucher code.
- When you are ready to subscribe and download installers, follow this link to initiate the process: <https://www.simutext.com/student/register.html#/key/U6xv-ca8X-PcKq-W7qB-zbd6>
- After you have completed the subscription process, if you need to download the SimUText application installers again, you will be able to access them by logging into the [SimUText Student Portal](#) (<https://www.simutext.com/student>).

Save this email! Should you encounter problems, you may need your course-specific Access Key. It is: **U6xv-ca8X-PcKq-W7qB-zbd6**

Problems or questions? Visit [SimUText Support](http://simbio.com/support/simutext) (<http://simbio.com/support/simutext>)

COURSE SCHEDULE - Readings for Weeks 3-10 to be assigned on Canvas

Weeks 1& 2

Introduction: Tropical Ecosystems and Introduction to Reef Builders

What are the major tropical ecosystems & where are they?

The main sources of PP

Main drivers of structure

Global distribution

General geographical and geopolitical context

Introduction to main reef builders

Readings:

A Very Short Introduction to Coral Reefs

Biology of Coral Reefs, Sheppard et al, Chs. 1 & 2 (On Canvas)

Tropical Connections – Chs. 4, 5 (pp. 248-266) & 6 (pp. 296-313)

FIRST ONLINE QUIZ & VIDEO – Assigned on or before Sept. 29, due Oct 5

Week 3 – Getting Started – Sex and Reproduction on Reefs

Introduction to larval ecology & Echinoderms

Guest Speaker Oct. 10

Richard Emlet, Oregon Inst. of Marine Biology

Week 4 - Symbiosis and Introduction to Coral Bleaching

Bleaching and Coral Reef Watch

Coral Reef Watch Assignment Begins Oct. 16 – Due Oct. 29

Week 5 – Sponges in Tropical Ecosystems

Guest Co-instructor Cristina Diaz

Nova Southeast University and Harbor Branch Oceanographic Inst.

Weeks 6 & 7 Climate Change and Interaction with Bleaching

Climate Module Begins Oct. 30 – Due Nov. 5

Guest Lecturer Maria Kavanaugh, Nov. 7

Week 8 –Seagrasses & Mangroves (and some key ecological concepts)

Tuesday Discussion Activity: Group Project Preparation in discussion

Guest Speaker November 8

Craig Young, Director, Oregon Inst. of Marine Biology

Week 9 - Group presentations

Group Reports Due – Complete with all individual reports Nov. 21

No Class Nov. 21

Week 10 –Prognosis – Conservation

Discussion – Seashells and some plankton (More On CaCO₃)