

## **BI 410/510 TROPICAL MARINE BIOLOGY - WINTER 2015**

### **Professor Michelle Wood**

475 Onyx Bridge (Above Science Library)

Office Hours 9-11, Friday and by appointment

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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 Objectives***

Students successfully completing this course will be able to:

- 1) Identify and discriminate between different morphological types of coral and highlight differences between hard or stony corals and soft corals, using appropriate taxonomic descriptors.
- 2) Explain the role of photosynthetic symbionts and heterotrophy in the growth and nutrition of corals.
- 3) Create diagrams that show the relationships between different taxa of organisms in reef, seagrass, and mangrove communities - taking into account life history stages and trophodynamic relationships.
- 4) Interpret data on temperature in the upper ocean and atmosphere and predict its impact on reef communities in time scales of weeks or months – considering levels of organization from the intra-cellular to the ecosystem.
- 5) Predict whether patch reefs, barrier reefs, or atolls will grow (or diminish) given specific abiotic conditions.
- 6) Observe images of coral reefs, mangrove habitat, or seagrass beds and construct or complete natural history vignettes that correctly identify organisms, structures, conditions and/or linkages.
- 7) 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 why ocean acidification is not just about ‘dissolving shells and corals’.
- 8) Communicate information about the importance of healthy tropical ecosystems to a general audience, using examples and data to show the importance of biology to a modern society.
- 9) Interpret and analyze scientific literature, including graphical information – using both written and oral communication effectively.

**TEXTBOOKS** – Resources to help understand and enrich lectures and to help with assignments and projects

- 1) *The Biology of Coral Reefs*, C. R.C. Sheppard, S.K. Davy, and G. M. Pilling – 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 (.pdf on Blackboard)
  - a. Available as e-chapters from [www.ian.umces.edu](http://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
- 3) *Science of Marine Reserves*, Caribbean and Latin America – PISCO brochure (.pdf on Blackboard)
- 4) *Ocean Acidification*, A National Strategy to Meet the Challenges of a Changing Ocean (.pdf on Blackboard)
  - a. Also available for purchase a physical book and as a free download at <http://www.nap.edu/catalog/12904/ocean-acidification-a-national-strategy-to-meet-the-challenges-of>
- 5) Clickers – I am experimenting with using clickers; at this point they are ‘recommended’ for this course but not required.

OTHER READINGS WILL BE ASSIGNED AS PART OF MID-TERM EXAM OR FINAL, OR IN CONNECTION WITH LECTURES. THESE WILL BE ANNOUNCED IN CLASS AND ON BLACKBOARD

**PROJECTS (BI410)** Tropical Marine Ecology is a very exciting and rapidly developing field - similar, in fact, to the state of change in 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 develop for presentation to the class in both oral and written form. Grading on this project will be based on the written component, which will require some individual input from each member of the group, an oral presentation in which all group members should participate, and individual student reflection on the presentation of others. More details on possible topics and the structure of this assignment will be given in class. We will begin group projects in the first Discussion section.

**BI510 – PROJECT AND DISCUSSION** The project will be of individual design and include more review of primary literature, development of a research proposal, and presentation of a 15 minute topical lecture to the class. BI510 students will assist with development of BI410 discussion materials and attend as available. BI510 students are also responsible for knowing the content of BI410 discussion as it relates to slide quizzes and exams, and will also participate in an extra graduate-level 1hr journal club/seminar as arranged with the instructor.

**CLASS ENVIRONMENT, STANDARDS, AND RESPECTFULNESS** - As an upper-division course, I have high expectations for performance and your commitment to 'stretching' – seeking deeper learning, more creative exploration, and greater mastery of concepts than ever before. Students are expected to be prepared for discussions and to make an effort to ensure that all people in the class have an opportunity to be heard and to learn. Electronics should be muted, and used only to enhance the learning environment and class process. People with different backgrounds bring a lot of different kinds of wisdom – please share yours and listen for others'.

**Regarding communication** -- I am available almost all the time by email and will try to answer email as soon as I can (usually within 4 hours unless it arrives after 8 PM at night). I love having people come talk with me in my office... feel free to make an appointment or even drop in if office hours are not convenient for you. I am also happy to review work you are planning to hand in and talk about how it could be made better and brought to an even higher standard than you have already achieved when we meet!!!

**Grading and Academic Integrity** -- Work is expected to be completed to a high standard and to be on time. Group work requires careful attention to shared credit and all students are expected to be familiar with and follow UO policies on plagiarism and other forms of academic dishonesty. Resources:

Student Conduct Code:

<https://uodos.uoregon.edu/StudentConductandCommunityStandards/StudentConductCode.aspx>

Plagiarism:

[http://tep.uoregon.edu/resources/faqs/preparingtoteach/forms\\_academicdishonesty.html](http://tep.uoregon.edu/resources/faqs/preparingtoteach/forms_academicdishonesty.html)

<http://library.uoregon.edu/guides/plagiarism/students/index.html>

**COURSE GRADE** – Basically on a straight 100 point scale. Details of assignments and due dates are on the accompanying course schedule. There are no makeups for slide quizzes and exams and material that is turned in late will be seriously penalized as, in nearly all cases, the material you are turning in is also the basis for class discussion.

Week 4 -- Slide Quiz --- 5 pts

Week 5 -- Slide Exam and take-home mid-term – 25 pts

Week 7 -- Climate Change Assignment – 15 pts

Week 9 -- Slide Quiz – 10 pts

Week 10 – Project Reports 25 pts

FINAL -- 20 pts.

XC as announced on schedule (for Week 2 and Week 10)

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TROPICAL MARINE ECOLOGY - SCHEDULE

Week	Topic	Readings	Points
		TC=Tropical Connections BCR=Biology of Coral Reefs	
Week 1	Jan. 6&8		
Lect 1	Intro to Tropical Marine Ecology		
Lect 2	Dominant Tropical Marine Ecosystems and their status	TC; 168-96;250-64;297-08 (from Chs. 4-6); BCR,Ch.8.1-8.5.1	
Week 2	Jan. 13&15		
Disc 2	TROPICAL TOPICS - Reef Watch & Coral List	Begin to choose project topic	2XC
Lect 3	Coral Reef general biology and geology	TC; 168-96; BCR, Chs. 1, 3	
Lect 4	Cnidarian biology -stony corals	BCR, Ch. 2	
Week 3	Jan 20&2		
Disc 3	Fiji Reef Movie; Marine reserves	BCR Ch. 8.1-8.4; <i>Science of Marine Reserves</i> (online)	
Lect 5	Sea fans and soft corals, sponges (Porifera)	BCR, Chs. 1-3;	
Lect 6	Other major reef builders and bioeroders	BCR, Chs. 1-3; TC 168-96; BCR 179	
Week 4	Jan. 27&29		
Disc 4	Animal and plankton mini-lab; Project Topic ID'd	Handout, BCR, Ch. 5	
Lect 7	Slide Quiz and discussion		5
Lect 8	Other significant molluscs and echinoderms Take-home mid-term distributed	BCR, pp. 198 & 202	
Week 5	Feb. 3&5		
Disc	Slide Exam; Take-home mid-term due; discussion		25
Lect 9	Symbionts, photosynthesis & bleaching	BCR, Ch. 4	
Lect 10	Other significant invertebrates and macro-symbioses Climate Change Assgmt for Discussion distributed	BCR, Ch. 4	
Week 6	Feb 10&12		
Disc	Climate Change Lab	SimBio Online Unit; Handouts from Lecture 10	
Lect 11	Ocean Acidification (OA), climate change	<i>Ocean Acidification</i> - As Assigned	
Lect 12	Ocean Acidification (OA), climate change	BCR, Ch. 8.5-8.9;	

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## TROPICAL MARINE ECOLOGY - SCHEDULE

Week 7	Feb. 17&19			
Disc	Climate Change Assgmt Due & Discussed -			15
Lect 13	Fish 1		BCR, Ch. 6 & 7	
Lect 14	Fish 2		BCR; Ch. 6 & 7, TC (7 as assigned in class)	
	Migrants, big and small - Assignment distributed		See Blackboard Readings & Assgmt., TBA	
Week 8	Feb. 24&26			
Disc	Online discussion of migrants and connectivity			
Lect. 15	Mangrove Communities	Dr. Craig Young	TC, Ch. 6	
Thurs	NO CLASS	PROJECT OUTLINES DUE BY EMAIL		
Week 9	March 3&5			
Disc	Discussion of Migrants and Connectivity; Seagrass Beds		TC, Ch. 5	
Lect 16	Seagrass Beds (cont) and Mangroves		TC, Ch.6 and pps. 350 & 357-359 in Ch. 7	
Lect 17	Slide Quiz and discussion			10
Week 10	March 10&12			
Disc	PROJECT PREPARATION			
Lect 18	PROJECT REPORTS			
Lect 19	PROJECT REPORTS- TAKE-HOME FINAL DISTRIBUTED			25+3XC
FINALS	TAKE-HOME FINAL DUE	March 17 - 11:30AM by email or to Biology Office 77KLA		20
Week 2	13-Feb Discussion	2XC	Prepared notes for Topical Topics Discussion <b>DUE</b>	
Week 4	27-Jan Lecture	5 pts	Slide Quiz and Discussion	
Week 4	29-Jan Lecture		Take-home mid-term distributed and discussed	
Week 5	3-Feb Discussion	25 pts	Slide Exam and Take-home mid-term <b>DUE</b>	
Week 5	5-Feb Lecture		Climate assignment and directions distributed and discussed	
Week 7	17-Feb Discussion	15 pts	Climate Change Assgmt <b>DUE</b>	
Week 7	19-Feb Lecture		Migrant& connectivity investigation assgmt distributed	
Week 8	26-Feb Email		PROJECT OUTLINES DUE	
Week 9	3-Mar Discussion		Migrant and Connecivity assignmen dicussed, project outline feedback	
Week 9	5-Mar Lecture	10 pts	Slide Quiz and Discussion	
Week 10	Mar 10 & 12 Lecture	25 pts + 3XC*	PROJECT REPORTS, Written Project due 3/12 & final distributed 3/12	
FINALS	17-Mar 11:30AM	20 pts	Take-home final <b>DUE</b> , email or Biology Office	
		105 pts	No makeups on slide quizzes or exams; late work significantly penalized	
*XC for written comments on presentations				