

BIO SCI E120 – MARINE BIOLOGY – SPRING 2016

Time: Tuesday & Thursday, 2:00-3:20 pm

Room: DBH 1600

Instructors & Office Hours:

Dr. Cascade Sorte, csorte@uci.edu, Steinhaus 359, Tuesday 12:45-1:45 pm & by appointment

Dr. Matthew Bracken, m.bracken@uci.edu, Steinhaus 457, Tuesday 3:30-4:30 pm & by appointment

TA: Lauren McQuinn, lmcquinn@uci.edu, Steinhaus 387, Thursday 12:45-1:45 & by appointment

Course Description: This course is an introduction to biological processes in ocean ecosystems. We will examine the biotic and abiotic factors influencing the physiology, distributions, abundances, interactions, and evolution of marine organisms. We will also evaluate human impacts on marine ecosystems.

Goals

1. Develop an understanding of the processes underlying patterns observed in marine systems
2. Be able to interpret and evaluate the results and presentation of scientific research
3. Clearly communicate scientific information

Class Participation: It's very important – to your individual and our group success – that everyone

- (1) attends and focuses in class (see policy below),
- (2) does the assigned reading,
- (3) contributes questions and ideas during class discussions, and
- (4) encourages and considers everyone else's questions and ideas.

Readings

Required textbook: "Marine Biology: A Very Short Introduction" by Philip V. Mladenov

Optional textbook: "Marine Biology" by Jeffrey S. Levinton (*on reserve in library*)

Required research paper and case study PDF's (listed below) will be posted on the course EEE site.

Grading:	80%	Exams (40% each of the top 2 exam grades; April 21, May 17, June 9)
	10%	Field Trip (by May 31)
	5%	Discoveries in Marine Biology Exercise (March 31)
	5%	Synthesis Exercise (June 2)

Grading Scale: A+ = 97+, A = 93-96, A- = 90-92, B+ = 87-89, B = 83-86, B- = 80-82, C+ = 77-79, C = 73-76, C- = 70-72, D = 60-69, F <60. *Grades round up, so that 92.5 = A.* Grading is on a straight scale, not curved.

Exams: There will be 3 exams, each including a mix of multiple choice (scantron) and short answer questions. Practice for the exams will be provided as "pre-lecture quizzes", questions on projected Powerpoint slides at the beginning of each class period. Exams will focus on recent topics but are also cumulative in the sense that the course topics are designed to build on each other. The end of each class period before an exam will be used for review, and students are encouraged to email the instructors with questions to be addressed during this review. The lowest exam grade will be dropped.

Field Trip: Your class fee covers entry to the Aquarium of the Pacific in Long Beach, and we have allotted one lecture period for this field trip (although you can go anytime you like before May 31). TA McQuinn will provide details on how to get your Aquarium pass and will post a worksheet on the EEE website that you should print and bring with you when you go. You will receive credit for this exercise based on (1) your grade on the worksheet, and (2) taking a selfie in front of your favorite exhibit and turning it in on EEE by May 31 at 11:59 pm PST.

Discoveries in Marine Biology and Synthesis Exercises: Details will be provided during class and on EEE.

Class Attendance Policy: Attendance is not required or monitored *per se*; rather, each student is responsible for their participation in the course. There is a documented, significant relationship between attendance and performance: students that attend class get better grades. Because of this, and because the instructors can only help students learn to the degree that they are *present* and *engaged*, we encourage you to prioritize *attendance* and *focus*.

All exams and exercises must be completed at the designated time. Be sure to arrive on time for exams: no new exams will be distributed after the first student leaves the exam. Make-up exams or exercises may be given at the instructors' discretion *only* if students (1) email instructors at least 1 week ahead (for planned absences, e.g., due to religious observance) or before class starts (2:00 pm PST) on exam/exercise days for unexpected absences

(due to emergencies or sickness requiring a medical visit) and (2) provide appropriate, official documentation as requested. Make-up exams or exercises will be primarily essay based.

Students are responsible for adhering to UCI policies on class attendance (beyond the policies listed above), requesting disability services, and academic honesty.

Case Studies

1. Bracken, M. E. S., B. A. Menge, M. M. Foley, C. J. B. Sorte, J. Lubchenco, and D. R. Schiel. 2012. Mussel selectivity for high-quality food drives carbon inputs into open-coast intertidal ecosystems. *Marine Ecology Progress Series* 459: 53-62.
2. Karl, D. M., C. O. Wirsen, and H. W. Jannasch. 1980. Deep-sea primary production at the Galápagos hydrothermal vents. *Science* 207:1345-1347.
3. McLeod, K. L., and H. M. Leslie. 2012. Why ecosystem-based management? Pages 3-12 in K. L. McLeod and H. M. Leslie, editors. *Ecosystem-Based Management for the Oceans*. Island Press, Washington, DC, USA.
4. Pechenik, J. A. 1999. On the advantages and disadvantages of larval stages in benthic marine invertebrate life cycles. *Marine Ecology Progress Series* 177: 269-297.
5. Purcell, E. M. 1977. Life at low Reynolds number. *American Journal of Physics* 45: 3-11.
6. Sandin, S. A., J. E. Smith, E. E. DeMartini, E. A. Dinsdale, S. D. Donner, A. M. Friedlander, T. Konotchick, M. Malay, J. E. Maragos, D. Obura, O. Pantos, G. Paulay, M. Richie, F. Rohwer, R. E. Schroeder, S. Walsh, J. B. C. Jackson, N. Knowlton, and E. Sala. 2008. Baselines and degradation of coral reefs in the Northern Line Islands. *PLoS ONE* 3:e1548.
7. Shurin, J. B., D. S. Gruner, and H. Hillebrand. 2006. All wet or dried up? Real differences between aquatic and terrestrial food webs. *Proceedings of the Royal Society B: Biological Sciences* 273: 1-9.
8. Smith, J. R., P. Fong, and R. F. Ambrose. 2006. Long-term change in mussel (*Mytilus californianus* Conrad) populations along the wave-exposed coast of southern California. *Marine Biology* 149: 537-545.
9. Sorte, C. J. B., and G. E. Hofmann. 2005. Thermotolerance and heat-shock protein expression in Northeastern Pacific *Nucella* species with different biogeographical ranges. *Marine Biology* 146: 985-993.
10. Sorte, C. J. B., S. L. Williams, and R. A. Zerebecki. 2010. Ocean warming increases threat of invasive species in a marine community. *Ecology* 91: 2198-2204.

Schedule (topics – but not dates of exams or assignments – are subject to change)

Week	Day	Date	Topic	Speaker	Readings	Levinton
1	Tues	29-Mar	Introduction to marine biology	Sorte	Introduction	Ch. 1
	Thurs	31-Mar	Discoveries in marine biology	McQuinn	Smith et al. 2006	
2	Tues	5-Apr	Oceanography	Sorte	Ch. 1	Ch. 2
	Thurs	7-Apr	Marine environment & ecophysiology	Sorte	Sorte & Hofmann 2005	Ch. 4
3	Tues	12-Apr	Life in a fluid: plankton vs. nekton	Bracken	Ch. 2, Purcell 1977	Ch. 5,7,8
	Thurs	14-Apr	Drivers of plankton abundance	Sorte	Ch. 2	Ch. 9
4	Tues	19-Apr	Productivity & food webs	Bracken	Ch. 2	Ch. 10
	Thurs	21-Apr	Exam 1			
5	Tues	26-Apr	Reproduction, dispersal & migration	Sorte	Pechenik 1999	Ch. 6
	Thurs	28-Apr	Ecological and evolutionary processes	Bracken	Shurin et al. 2006	Ch. 3
6	Tues	3-May	Benthic habitats & species	Bracken	Bracken et al. 2012	Ch. 11-13
	Thurs	5-May	Intertidal habitats	Sorte	Ch. 7	Ch. 14
7	Tues	10-May	Coastal subtidal habitats	Bracken	Ch. 3 & 5	Ch. 15
	Thurs	12-May	Deep sea habitats	Bracken	Ch. 6, Karl et al. 1980	Ch. 16
8	Tues	17-May	Exam 2			
	Thurs	19-May	Biodiversity & human impacts	Bracken	Ch. 8, Sandin et al. 2008	Ch. 17-19
9	Tues	24-May	Climate change & invasions	Sorte	Sorte et al. 2010	Ch. 17-19
	Thurs	26-May	Marine conservation	Bracken	McLeod & Leslie 2012	Ch. 17-19
10	Tues	31-May	Field trip (Aquarium visit) on own			
	Thurs	2-Jun	Review & Synthesis	Sorte		
	Thurs	9-Jun	Exam 3 (1:30 to 3:30 pm)			