ESM 254 Course Syllabus

COASTAL MARINE ECOSYSTEM PROCESSES

Spring 2021; Tuesday and Thursday; ZOOM; 12:30-13:45.

Course objectives: The course explores the foundational science of coastal oceanography and ecosystem processes, and then considers ways in which that science is applied to manage, restore, and conserve coastal marine resources. Major goals of the course are students (1) strengthening their understanding of marine science and writing skills by crafting short essays about contemporary coastal marine resources issues, and (2) articulating scientific principles and negotiating an equitable outcome for a coastal marine ecosystem conflict in a class debate. Achieving the two goals provides students an opportunity to further develop and apply their understanding of interdisciplinary coastal marine ecosystem science.

The course covers the physical, chemical, geological, and biological oceanography, and ecological processes associated with coastal ocean ecosystems, continental shelves, kelp forests and rocky reefs, coral reefs, estuaries, polar environments, and sandy beaches. We will consider important human-resource interactions in coastal systems, and emphasize research relevant to resource management. Students will explore contemporary environmental issues associated with various topics, and generate discussion of those issues in class, as well as write about them.

Of course, this course will be on Zoom! But at least there are no exams. We will prevail. All the necessary information is provided on Gauchospace.

Course work: Each student will complete weekly readings assignments and write four 2-page popular newspaper- or blog-style articles (with references) on topics related to material presented in lectures. The articles will cover the science and policy related to a contemporary problem facing marine resource management, climate change, conservation, or business. Students will select their own topics and submit their articles every two weeks. Students will work with Lenihan to develop the ideas, plan and execute the writing, and edit the material. The goal is to write something good enough to be published in the LA Times, Santa Barbara Independent, a preferred blog, or another general science outlet.

All students will also participate in a debate at the end of the quarter in which roles will be played that represent disparate sides and opinions of a major issue facing coastal marine resource management. Students will select roles to play, representing different stakeholder groups, prepare through reading the scientific literature, related reports or blogs, talking with experts, and integrating information from other Bren courses. Be well prepared will allow for a well-informed debate the objective of which is to develop new ideas to help solve a major human-resource interaction conflict in the coastal ocean.
**Course readings.** All students will read course material assigned each week. The readings provide the basic information needed to understand how coastal marine systems function. They are basis for the lectures normally given in this course.


These assigned readings, and a few other key articles, will be provided, in pdf form, on Gauchospace. The readings are those that a Masters or PhD graduate student in Marine Sciences would read in part to obtain their degree, thus will provide you with a solid foundation for understanding Coastal Marine Ecosystem Processes.

**Grading:** Effort, improvement, and timeliness in writing the articles, and preparation for and participation in the debate are required for a passing grade. How well you do in each aspect merits the specific grade that you will receive.

**Class schedule and topics**

**Week 1:  30 March/1 April**

Tuesday  Introduction, and discuss course objectives and assignments

Thursday  Ocean circulation

*Reading: Ocean Circulation, Chapters 1 and 2. Introduction, and the atmosphere and the ocean. 21 pages. Chapter 3, Ocean currents, pages 17-35 and 64-74.*

**Week 2:  6 April/8 April**

Tuesday  CA current ecosystem

Thursday  Santa Barbara Channel Ecosystem


**Weeks 3:  13 April/15 April**

Tuesday  Kelp forest ecosystems (Dr. Bob Miller)

Thursday  Beach communities (Dr. Jenny Dugan)

**Weeks 4: 20 April/22 April**

Tuesday  
Soft-sediment communities

Thursday  
Estuaries and lagoons

Weekly Reading: **Waves, tides, and shallow water processes,** Chapter 4, Principles and processes of sediment transport. 27 pages. **Soft-sediment communities,** Chapter 10 (by J. Byers and J. Grabowski) in Bertness et al. (2014). 22 pages

**Week 5: 27 April/29 April**

Tuesday  
Kelp forest restoration (Jordan Gallagher)

Thursday  
Wetlands restoration (Dr. Mark Page)


**Week 6: 4 May/6 May**

Tuesday  
Fisheries 1

Thursday  
Fisheries 2


**Week 7: 11 May/13 May**

Tuesday  
Marine reserves 1

Thursday  
Marine reserves 2

Reading: **Gaines et al. (2010),** Designing marine reserve networks for both conservation and fisheries management. PNAS 107:18286-18293. **De Leo and Micheli (2015),** The good, the bad and the ugly of marine reserves for fishery

**Week 8: 18 May/20 May**

Tuesday
Small scale fisheries management and conservation (Jono Wilson)

Thursday
Aquaculture


**Week 9: 25 May/27 May**

Tuesday
Debate preparation

Thursday
A Fisher’s perspective – Chris Voss

*Reading:* **TBD**

**Week 10: 1 June/3 June**

Tuesday
Class debate

Thursday
Field trip!