

ESM 254 Course Syllabus

COASTAL MARINE ECOSYSTEM PROCESSES

Spring 2018; Monday and Wednesday; Bren Hall 1414; 14:00-15:15.

Course objective: Explore physical, chemical, geological, and ecological processes in coastal marine ecosystems. We will learn the foundational marine science associated with coastal oceanography and ecosystem processes, and then apply our understanding by examining approaches, tools, and policies associated with marine coastal resource management, restoration, and conservation. A major emphasis is placed on (1) students writing short essays that synthesize scientific information related to problem solving in coastal marine ecosystems, and (2) field trips. *This year's course will emphasize the influence of climate change on the marine ecosystem.*

Course work: (1) The course covers the basics and important details of physical, chemical, geological, and biological oceanography, and ecological processes associated with coastal ocean ecosystems, continental shelves, kelp forests and rocky reefs, estuaries, polar environments, and sandy beaches. We will consider the most relevant human-resource interactions in coastal systems, and emphasize research uncovering the influence of climate change on marine ecosystem and oceanographic processes. Guest lectures will be presented by eminent UCSB marine scientists.

(2) Students will explore and research contemporary environmental issues associated with each lecture topic, and generate discussion of those issues in class as they choose.

(3) Each student will complete **three 1.5-2 page popular journal (i.e., newspaper)-style articles** on topics associated with material presented in class. Students will select their own topics and turn in their articles when they choose. The articles will cover the **science and policy** related to a contemporary problem facing marine resource management, climate change, conservation, or business. The best of the articles will be posted on the web, the specific website TBD.

(4) Students will participate in a debate/negotiation concerning a hot marine topic, e.g., the development of intensive offshore aquaculture in CA coastal waters. Teams of students will role-play as different stakeholders. Everyone will prepare ideas and material to help make their case. This will be conducted the last week of the course, and will provide students the opportunity to exhibit the skills and ideas that they have learned while at Bren.

Course readings: (1) M.R. Bertness, B.J. Silliman, and J. Stachowicz (eds.) **Marine Community Ecology and Conservation**. Sinauer Press. Chapters listed for each week (see below). (2) **Waves, Tides, and Shallow Water Processes**. The Open University. (3) **Ocean Circulation**. The Open University. (4) **Seawater: Its**

Composition, Properties, and Behavior. The Open University. All texts have been placed on reserve in Bren library.

Grading: There are no exams. Students will be graded for participating in class discussions, performance on the three written marine science articles (worth 20 pts. a piece), and participation and performance in the final debate/negotiation

Class schedule and topics

Week 1: 2 April/4 April

Monday Lecture: *Climate change and marine ecosystems: an overview*

Wednesday Lecture: *Ocean circulation*

Reading: Bertness et al. Chapter 8- Marine historical ecology

Week 2: 9 April/11 April

Monday Lecture: *Coastal circulation and upwelling*

Wednesday Lecture: *Continental shelf ecosystems and processes*

Reading: Bertness et al. Chapter 15- Pelagic communities

Weeks 3: 16 April/18 April

Monday Lecture: *Waves and tides*

Wednesday Lecture: *Shallow water processes*

Reading: Bertness et al. Chapter 7- Biogeography of marine communities

Weeks 4: 23 April/25 April

Monday Lecture: *Kelp forest ecosystems (Bob Miller)*

Wednesday Lecture: *Kelp forest restoration (Dan Reed)*

Reading: Bertness et al. Chapter 14- Kelp forest communities

Week 5: 30 April/2 May

Monday Lecture: *Beach ecosystems (Jenny Dugan)*

Wednesday Field trip: *Beach communities (Nick Schooler)*

Reading: Bertness et al. Chapter 6- Biodiversity and ecosystem function

Week 6: 7 May/9 May

Monday Lecture: *Estuarine ecosystems*

Wednesday Field trip: *Deverueax Slough Reserve (Christina)*

Reading: Articles- Schlacher et al. (2008), Dugan and Hubbard (2010)

Week 7: 14 May/16 May

Monday Lecture: *Salt marsh and seagrass communities*

Wednesday Lecture: *Salt marsh restoration (Mark Page)*

Reading: Bertness et al. Chapter 12- Seagrass communities

Week 8: 21 May/23 May

Monday Debate preparation

Wednesday Field trip: *Carpinteria Salt Marsh Reserve (Andy Brooks)*

Reading: Bertness et al. Chapter 11- Salt marsh communities

Week 9: 28 May/30 May

Monday Holiday

Wednesday Lecture: *Oil exploration and impacts*

Reading: Osenberg et al. (2002)

Week 10: 4 June/6 June

Monday Debate

Wednesday Field trip: *Whale ecology*