

## **SIO219 ESTUARINE PROCESSES SYLLABUS – WINTER 2015**

SIO 219, section 835965, 4 units

*Instructor:* Sarah Giddings, [sarahgid@ucsd.edu](mailto:sarahgid@ucsd.edu)

*Class meetings:* Jan 6 - Mar 20, Tues, Thursday 12:30am-2pm, Eckart Sea Cave **\*may be moved to 12am-1:30pm\***

*Office hours:* Mondays 9-11, MESOM 363 (except Jan 12, 19, Feb 16 Tuesday 9-11)

### **Course Summary**

This course will cover estuarine and coastal processes. While the bulk of the course will focus on the physical dynamics, topics will include biological, chemical, and ecosystem dynamics and interactions in estuaries and river plumes. The course will cover the following topics: Review of fluid mechanics, open channel flow (turbulence and the bottom boundary layer), tides (origin and propagation in estuaries), stratified turbulence, estuarine classification and types (mixed, fjords, inverse, etc.), tidally averaged dynamics, subtidal time dependence, intratidal variations, lateral processes, dispersion mechanisms, sediment transport, estuarine productivity (including nutrient delivery, eutrophication and oxygen depletion), estuarine ecosystems (benthic, intertidal, fisheries, etc.), river plumes, wind-driven coastal upwelling, and estuarine fronts.

### **Requirements:**

While there are no required classes to participate in this class, some introduction to fluid mechanics or physical oceanography is helpful as is introductory calculus. Please check with the instructor if you have concerns about your background but note that this course is intended to be for an interdisciplinary group of students.

### **Credit & homework:**

Grades will be based on homework (20%), in-class participation (30%), and a final project + presentation (roughly 50%). The final project will include data analysis and presentation of results from existing estuarine datasets and/or data collected during this class.

### **References:**

#### *Textbooks:*

There are many textbooks that are compilations of papers about estuaries but no definitive text for this class. Thus we will be pulling from a variety of texts and papers. Some of particular interest that may be worth purchasing:

- Contemporary Issues in Estuarine Physics, 2010, Ed. A Valle-Levinson. Cambridge University Press. Available on-line through UCSD at <http://ebooks.cambridge.org/ebook.jsf?bid=CBO9780511676567>
- Estuarine Ecology, 2013, JW Day, BC Crump, WM Kemp, A Yáñez-Arancibia. Wiley-Blackwell. Available on-line through UCSD at <http://onlinelibrary.wiley.com/book/10.1002/9781118412787>

Also check out:

- Treatise on Estuarine and Coastal Science, 2011, Ed. E Wolanski and D McLusky. Elsevier, Inc. Available on-line through USCD at <http://www.sciencedirect.com/science/referenceworks/9780080878850#ancv1>
- Mixing in Inland and Coastal Waters, 1979, HB Fisher, EJ List, RCY Koh, J Imberger, and NH Brooks. Academic Press.