SIOC205 ESTUARINE & COASTAL PROCESSES SYLLABUS – SPRING 2024
SIOC 205C, section 509311, 4 units
instructor: Sarah Giddings, sgiddings@ucsd.edu
class meetings: 04 April – 06 June 2024, Tu/Th 09:30-10:50, Eckart 236
discussion/problem session: Th 08:30-09:20
office hours: TBD or by appointment

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, river plumes, and over the shelf. The course will cover many of 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, fronts, dispersion mechanisms, sediment transport, special estuary types (glacial fjords, low-inflow), estuarine/coastal productivity (including nutrient delivery, eutrophication and oxygen depletion), estuarine/coastal ecosystems (benthic, intertidal, fisheries, etc.), river plumes, shelf dynamics (coastal-trapped waves, dynamical balances, wind-driven coastal upwelling), and human/climate interactions. *The exact schedule and topics will be adjusted based on students' interests!*

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. Several homework assignments also are greatly simplified by using more advanced analysis tools (such as MATLAB or Python). 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*.

Expectations & course credit:
Participation in class and discussion/problem sessions is critical as many of the course projects build on one another and even require pieces from other class members/groups. Thus, completing the assignments and participating in class, discussion/problem sessions, and mini-labs are critical to success. Grades will be based on homework (50%), and a final project presentation (25%) and report (25%). Assignments are due by midnight on the due date, submitted as pdf files through Canvas. While most of this class encourages working in groups, submitted homework solutions must be the work of the submitting student (i.e., so even if you work together, no group reports, except for on the final project). Note that while the assignments will not receive detailed grading, all homework is assigned a numeric value and late assignments without an extension request in advance (extensions are given liberally!) will be penalized with a significant grade reduction (10% per day) for that particular assignment. Note that many problems will require working with data and/or plotting where you can use your program of choice (e.g., MATLAB, Python, etc.). The final project will include data analysis and presentation of results from existing estuarine/coastal datasets and/or data collected during this class. I always encourage students to try to leverage their own research whenever possible, even if their work is not in an estuary or coastal region. Applying some of the concepts learned in this class to different environments can actually be quite fruitful.

Ethics & Academic Integrity:
Given the nature of the assignments and assessments in this class, cases of academic dishonesty are a low risk, nevertheless, it is worth mentioning that academic integrity is expected. Assignments or final reports that are copied directly from other students, former students, or on-line resources will receive no credit. I also strongly discourage use of any AI programs to assist in writing reports. Of particular importance to this class is appropriate attribution for any references (published or on-line material) used in the assignments and final report. I trust that as students pursuing a graduate degree you will follow proper ethical conduct as academic integrity is expected throughout your career. If at any point, you are unsure of the expectations for a particular assignment, presentation, or other situation, please ask me. I will maintain a strict policy of ethical conduct throughout the course and follow the appropriate UCSD Academic Integrity process if any violations occur. No exceptions. Please sign and submit the UCSD Excel with Integrity Pledge.

Course modality and absences for Spring 2024:
I will be posting course material in Canvas, and also sending announcements via Canvas, so please make sure you are able to access Canvas and contact me if you are not. Additional material (datasets) will be available via a google drive.

The course will be in-person in Eckart 236. This class relies on in-class participation and group work, so please do your best to attend regularly. If you need to be absent, please let me know and I will try to accommodate an occasional absence. I do request that if you are sick, please use your best judgment and stay home if you have significant symptoms. It is possible we may need to switch to remote instruction a couple of times during the quarter. If this occurs, we will use Zoom with links available through Canvas and will record the lectures for both synchronous and asynchronous participation. In this case, I will send out additional instructions regarding Netiquette and lecture recording information if that becomes necessary. Most importantly, let us all pledge to remain respectful, supportive, and adaptable to ensure that educational goals are met. All course participants are bound by the UCSD Code of Conduct. Please reach out to me directly if there are issues prohibiting your full engagement in the course so that we can find a workable solution.

References:
There are many 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 include :
- Contemporary Issues in Estuarine Physics, 2010, Ed. A Valle-Levinson. Cambridge University Press. Available on-line through UCSD at
  https://doi.org/10.1017/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.