<u>Sample Syllabus</u>
Ridge to Reef: Coastal Ecosystem Ecology and Connectivity
OCN 457, Writing Intensive Focus Designation (WI)
Sakamaki D103
Instructor: Dr. Craig E. Nelson, Department of Oceanography, C-MORE Hale 119
craig.nelson@hawaii.edu, 956-0566, office hours by appointment
No Official Textbook or Reader – Frequent Handouts

Welcome to *Ridge to Reef*. This course is designed to train you in the scientific process while illuminating the ecosystems around you. The research focus – the ecology and biogeochemistry of catchments and coral reefs – is a platform from which to learn how to conduct science in the context of environmental processes of relevance to anyone living in Hawai'i. This course is unusual in that it emphasizes *authenticity*: your measurements and the conditions in which they are made are uncontrolled, and the conclusions you draw from them are your own and will be judged as such. Your success in the course is determined by your willingness and ability to learn to measure the environment rigorously, interpret and contextualize your measurements and communicate your newfound understanding. This course is Writing Intensive and satisfies this Focus Designation.

Course Description: This course will train you in the measurement of biogeochemical and ecological properties of stream, estuary and nearshore coral reef habitats. Using data collected in class laboratory and field exercises, the course will present methods of data analysis and integration, emphasizing ways of contextualizing and interpreting environmental measurements. Students will learn field and laboratory methodologies for assessing biogeochemical stocks (Chlorophyll, Alkalinity, pH, Dissolved and Particulate Organic and Inorganic C,N and P), stream and reef benthic ecology (invertebrate identification, algal biomass, rapid habitat and water quality bioassessment), aquatic metabolism (biological oxygen demand and diel metabolic balance), microbial ecology and watershed land use mensuration. Occasional guest lectures will integrate the concept of ahupua'a (historical units of resource management in Hawai'i generally delineated by catchments) and the ways in which coastal ecosystem management is linked to cultural, planning and political social constructs in the past, present and future.

Teaching Method: This course is centered around direct experience of the environment. Much of the research in the course will be done either in stream, estuary or reef environments or in the laboratory on samples collected from those habitats. Formal lectures will provide conceptual and cultural frameworks for the lab activities. As the course progresses increasing time will be spent in computer lab settings conducting data analysis, visualization, statistics, mapping/GIS and report development activities. It is expected that students will work in teams, and group participation and engagement are central to the success of the course.

Student Expectations, Reports and Grading: Students will be graded completely on participatory engagement and reporting (both oral and written); no tests will be given and the course will end on the final day of instruction. Every 3-4 weeks a report will be due, each roughly 20% of the final grade (with corresponding page limits of 5-10 pages) and increasing as the course progresses. Initially these will be technical summary reports on laboratory and field methods and results. As the course progresses these will be replaced with oral reports and draft synthesis reports integrating results from multiple prior laboratory exercises. All writing assignments will be complemented with in-class writing and data analysis workshops to facilitate both group interaction and data visualization/computer training.

Some writing assignments will undergo peer review in addition to instructor grading. Feedback from peer and instructor review will be provided and revision of writing assignments will be encouraged for additional credit. Grading of both oral and written reports will be on clarity, rigour and synthesis in equal parts. While sharing of ideas, results and workload is expected (and necessary) students are advised that any evidence of *uncredited* duplication (plagiarism) will be dealt with strictly and swiftly according to the UH Manoa Student Conduct Code.

Attendance and Field Trips: Field trips are scheduled for afternoons, but students must be flexible according to constraints of weather and laboratory logistics. Two or three all day Saturday field trips may be planned – students will be granted reduced classroom and laboratory time in these weeks to accommodate these trips. Students are expected to attend every lab, with exceptions made only with advance consent of the instructor. Students are expected to participate actively in field and laboratory exercises, as all lab work will be group activities requiring communication and teamwork. Missed assignments will result in a zero; late assignments will be penalized nominally and extensions will be granted only in cases of illness or family emergency with sufficient advance warning. There will be no extra credit opportunities.

Prerequisites: Mandatory prerequisites are OCN 201/L, OCN 310 or consent of the instructor. OCN 401 is recommended as a prerequisite or concurrent enrollment for seniors in GES, and courses on statistics and scientific writing are beneficial for all enrollees. Familiarity with word processing and spreadsheet programs is expected and internet fluency is essential.

Student Learning Outcomes: Students who take this course will emerge with a recognition of the importance of integrating biological, chemical and physical measurements to understand ecosystems. Students will appreciate how social and culture aspects of resource management influence land use and subsequently impact coastal ecosystem ecology. Students will have some fluency with basic biogeochemical and ecological measurements such that they feel qualified to examine "water quality" in aquatic habitats. Students will have a conceptual grasp of ecosystem metabolism and the role of microorganisms in biogeochemical cycles. Students will have a deeper understanding of the process of integrating environmental measurements into a

cohesive illustration of ecosystem processes and the role of climate and land use in influencing these processes. Students will feel comfortable with the structure and content of scientific reports, both oral and written.

A note on discrimination, harassment, and privacy:

The University of Hawai'i is committed to providing a learning, working and living environment that promotes personal integrity, civility, and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking. If you or someone you know is experiencing any of these, the University has staff and resources on your campus to support and assist you. Staff can also direct you to resources that are in the community. Here are some of your options:

As members of the University faculty, your instructors are required to immediately report any incident of potential sex discrimination or gender-based violence to the campus Title IX Coordinator*. Although the Title IX Coordinator and your instructors cannot guarantee confidentiality, you will still have options about how your case will be handled. Our goal is to make sure you are aware of the range of options available to you and have access to the resources and support you need.*

If you wish to remain ANONYMOUS, speak with someone CONFIDENTIALLY, or would like to receive information and support in a CONFIDENTIAL setting*, contact the Title IX office directly (Hawai'i Hall 124, 2500 Campus Road (808) 956-2299) or use the confidential resources available: http://www.manoa.hawaii.edu/titleix/resources.html#confidential*

If you wish to directly REPORT an incident of sex discrimination or gender-based violence including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence or stalking as well as receive information and support, contact: Dee Uwono Title IX Coordinator (808) 956-2299 t9uhm@hawaii.edu

DRAFT Course Calendar, Topics, Due Dates, and Field Trips (Subject to Change)

Tues	Core Topic	Tuesday	Thursday	Report Due
9-Jan	Intro/Stream Survey	Introductions	Field Trip – Mānoa Stream	
16-Jan	General Stream Biogeochemistry	Field Trip – Mānoa Stream	Stream Data Analysis	
23-Jan	Dissolved Nutrients	Dissolved Oxygen Incubations	Field Trip – S-LAB	
30-Jan	Dissolved Oxygen	BOD and Winkler Titration	Field Trip – Mānoa Fish and Inverts	
6-Feb	Aquatic Microbiology	Field Trip - Ala Wai Canal – Diel Oxygen	Microbiology Lab	Stream Report
13-Feb	Estuarine Ecology	Guest Lectures	Guest Lectures	
20-Feb	Stream Ecology	Peer Review	Field Trip – Kawainui Marsh	
27-Feb	Fishponds/ Hydrology	Hydrology	Field Trip – He‘eia Fishpond	Estuary Report
6-Mar	Ahupua‘a	Field Prep	He‘eia	
13-Mar	Coral Reefs	Sample Processing	Field Trip – HIMB Coral Reef Surveys	
20-Mar	Coastal Oceans	Sample Processing	Field Trip – Kāne‘ohe Bay Survey	
27-Mar	Recess	Recess	Recess	Recess
3-Apr	Groundwater	Data Analysis Workshop	Field Trip – Maunalua Survey	He ‘eia Report
10-Apr	PacIOOS Datasets	Data Analysis Workshop	Field Trip – Zooplankton	Oral Articles Due Tuesday
17-Apr	Data Analysis Workshop	Data Analysis Workshop	Data Analysis Workshop	
24-Apr	Data Analysis Workshop	Data Analysis Workshop	Data Analysis Workshop	K-Bay Report
1-May	Oral Presentations	Oral Presentations	Course is Over!	Oral Present.

OCN 457 COURSE OBJECTIVES AND GRADING

This is a guideline only and may change over the course of the semester.

The emphasis of this course is on the importance and relevance of biological and chemical measurements in the aquatic environment to understanding biological processes and ecosystem dynamics. Current challenges in aquatic ecosystem ecology rely on research which integrates many disciplines, demanding that scientists be diverse in their training. Such problems as aquatic pollution, global change, human land use, threats to biodiversity, and the maintenance of ecosystem services are all linked to chemical and physical processes in aquatic environments and their interaction with organisms of all shapes and sizes. All of the skills learned in this class are applicable in real-world jobs in aquatic biology and chemistry. In addition to becoming familiar with field and laboratory techniques, students are expected to produce a scientific paper in journal form based on the above analyses and related primary literature. The process of data analysis and presentation will afford the students competency in Microsoft Excel. Students are also required to prepare and give a 10 minute oral presentation based on a journal article related to physical or chemical limnology or oceanography. The objective of these tasks is to provide students with a working representation of field science, from data collection through analysis, interpretation, and written and oral communication. The final paper is handed in twice, allowing for a semblance of the review process.

The course is graded on a total of 500 points (with extra credit possible) as follows:

Participation (50 pts - roughly 10%): Students are expected to participate in all labs, field trips, tours, and lectures. OCN457 is a lab course and participation is required and essential for course objectives (i.e., this is a 'hands on' course).

Papers (380 pts – roughly 75%): There are scientific report write-ups associated with each of 4 modules learned in lab: Streams, Estuaries, Watersheds, and Bays. Students are required to submit a draft and final version of their paper. For example, one might write a discussion of the longitudinal and temporal changes in biological and biogeochemical parameters along Mānoa Stream/Ala Wai Canal, or a discussion of differences in stream physical and chemical parameters between streams draining watersheds having different land uses (e.g. Mānoa vs. He'eia). Papers written on pelagic or estuarine ecosystems will depend on the data collected and the number of field trips incorporated into the course. The instructor will discuss the rough draft with each student. Peer Review will be done for every paper. Comments are to be incorporated in the final version of the report. The first draft is worth 75 points and the final draft is worth 100 points. For each day the final or draft paper is late, 10% of the points will be deducted. Report guidelines are provided and will be discussed in lab. See the schedule for report due dates.

Oral presentation (70 pts – roughly 15%): Students will give a 10 minute presentation on a journal article of some aspect of physical or chemical limnology or oceanography. Articles must be approved by the Thursday 12 April and presentations will be Tues 1 May.