

Applied Phytoplankton Ecology Course

Marine Science 394 / 394 L (4 credits)
University of Hawaii at Hilo
Hilo, Hawaii
Instructor: Dr. Jason Adolf (jadolf@hawaii.edu)

Major Topics:

1. Phytoplankton culturing techniques are important for establishing and maintaining cultures that contribute to our understanding of phytoplankton growth and ecology. The role of microalgae in biotechnology, including biofuels production, further requires understanding of the principles of culturing. Students in this class will establish, maintain and monitor cultures derived from local waters.
2. Phytoplankton are used as indicators of water quality, but interpretation requires general knowledge about plankton dynamics, and specific knowledge of the factors driving local phytoplankton dynamics. Students in this class will examine phytoplankton dynamics in various coastal Hawaiian settings and investigate their role as a potential indicator of overall water quality. Environments include embayments on the leeward and windward sides of Hawaii Island that have very different watershed characteristics, embayments heavily influenced by submarine groundwater discharge, and coastal anchialine ponds.
3. Flow cytometric analysis of phytoplankton is an important tool for both field and laboratory work. Students in this class will analyze natural and laboratory samples using an Accuri C6 analytical flow cytometer and will learn general principles of flow cytometry as well as specific applications to investigating phytoplankton dynamics.
4. GIS-based mapping of phytoplankton and water quality is important in areas such as coastal Hawaii where estuarine gradients affect the distribution of organisms and nutrients in the near-shore environment. This technique will be applied by students in Hilo Bay using small boats, and in smaller West Hawaii embayments using kayaks. Data are collected by 'dataflow' techniques utilizing YSI V2-4 6600 data sondes. Students will learn general principles of using these techniques to study phytoplankton dynamics and water quality.
5. Real-time continuous monitoring and telemetry from moored platforms complements spatial mapping, providing an important view of temporal changes in conditions. The Hilo Bay water quality buoy will be used to learn about establishment and maintenance of these systems and analysis of the data provided.

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