Oceanography: The Hawaiian Pacific
Final Syllabus

DAY	SESSION	WHAT	HOW
DAY 1 Monday	Morning	Introduction & overview, student learning modes Interdisciplinary Marine Science. History of oceanic exploration & study Text Chapters 1-2	Student introductions & survey. Discussion of interdisciplinary nature of Marine Science Student researched "Timeline of Significant Events in Oceanography"
	Afternoon	Marine cartography, map translations, projection of error. Defining oceans, oceanic mapping Lab Safety. Scientific Method	Flat map to 3-D coordinates onto student "mini globes". Student map preparation. Lab tour and review of lab procedures. Student designed theoretical experimentation.
	Evening	Natural/colonial/cultural history of Hawaii. Oahu sense of place	Video: "Strangers in Paradise: Natural History of the Hawaiian Islands", Hawaiian facts, vocabulary, trivia, shell craft.
DAY 2 Tuesday	Morning	Pangea, plate tectonics & volcanism. The role of continental drift in the past. Present and future location and boundaries of the world oceans. Text Chapter 3	Each student creates a portion of a world tectonic plate map. Using latitude and longitude coordinates, they position their map with others to create a wall-scale representation of a world map illustrating the tectonic plates and location of ocean and ocean floor features.
	Afternoon	Volcanic island arc formation & erosion. Review Volcano types, lava flows over the worlds "hot spots".	Video Short "Volcanoes". Students profile & determine relative 'age' of island chains, seamounts & guyots in Volcanic Archipelagos formed over mantle plumes.
	Evening	The life cycle of oceanic islands.	Students profile & determine relative 'age' of islands, seamount & guyots in Volcanic Archipelagos
DAY 3 Wednesday	Morning	Bathymetry, seafloor features, and seafloor spreading. Text Chapter 4	Students explore limitations in mapping the ocean floor. Class discussion on the major eras of geologic time, the fossil record and its relationship to the age of the ocean floors
	Afternoon	Marine sediment layers, geologic time and the marine fossil record Marine sediments and sampling techniques Text Chapter 5	Lab activity: Students examine and analyze "marine sediment core samples" and the fossils they contain to determine the "relative age" of the various layers and their respective artifacts.

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DAY 4 Thursday	Morning	Field testing and on-site sample analysis at Makapu'u Beach.	Field testing and sample analysis at Makapu'u Beach. Students leave campus at 9:00 am and work on-site until 2:30 pm.
	Afternoon	Field testing and on-site sample analysis at Makapu'u Beach.	Students complete field trip sheets and return to HPU.
	Evening	Filed Trip debriefing Summary of Marine Geology.	Students post and discuss data collected at Makapu'u Beach.
DAY 5 Friday	Morning	The "Ocean in Motion": waves, currents, tides, upwelling. coastal profiles. Text Chapters 9, 10, 11, 12	Research: Students research and report on assigned aspects of waves and the physical attributes of defined marine coastal environments impacted by the motion of ocean water.
	Afternoon	Surface sediment characteristics – Sandy beach – Makapu'u sample.	Lab Activity: Microscope use and comparative sand sample analysis
Sunday	Evening	The ocean's role in weather (including "extreme weather"), wind patterns, surface currents, upwelling, and tsunamis	Video Short: "Killer Tidal Waves". Lab Activity: Set up Station No. 1 of Day 6 Water Lab (to be analyzed Day No. 6).
DAY 6 Monday	Morning	Chemical nature of water, seawater chemistry. The significance of salinity in ocean environments. Text Chapter 6, 7, 13	Lab Activity: Special properties of water lab: cohesion, absorbency, diffusion, osmosis, solubility, salinity, qualitative pH. testing protocols.
	Afternoon	The range and distribution of salinity levels in marine environments. Students will demonstrate competence in the basic course concepts and topics covered in Physical Oceanography.	Activity: Mapping ocean salinity levels. Assessment: Physical Oceanography (Curriculum Day 1-6).
	Evening	Introduction to Marine Ocean life adaptations for survival in the sea. Text Chapter 13	Video short: "Adaptations for Survival in the Sea". Lab Activity: Set up simulated freshwater vs. saltwater fish physiology lab (results to be read on Day 11)
DAY 7 Tuesday	Morning	Primary productivity in the sea Marine "Zones"/"Communities": intertidal zones, kelp forests, sandy and cobble beaches, salt marshes and estuaries, coral reef communities, open ocean, deep ocean floor, hydrothermal vents. Population dynamics, estimating populations. Text Chapter 14, 16	Activity: Students prepare a wall-sized display of an "energy pyramid". Activity: Students will do "Random Sampling" of a marine organism population. Research: Students research, and report on a specific "Marine Community".

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	Afternoon	Identification and classification of plankton species. Population dynamics, estimating populations.	Lab activity: Students examine and prepare scientific drawings of mounted slides of phytoplankton and other marine producers Activity: Students will do "Random Sampling" of a population of sessile marine organisms (anemones).
	Evening	Students prepare ocean zone diagrams and explore life forms of the aphotic zones.	Field trip preparation and review of plankton collection protocols. Creation of student plankton nets. Students prepare ocean zone diagrams and explore life forms of the aphotic zones.
DAY 8 Wednesday	Morning	Field testing and on-site sample analysis and plankton collection at Kailua Bay	Field testing and sample analysis At Kailua Bay. Students leave campus at 9:00 Am and work on-site until 2:30 pm.
	Afternoon	Field testing and on-site sample analysis at Kailua Bay..	Students complete field trip sheets and return to HPU.
	Evening	Filed Trip debriefing Summary of Marine Productivity. Food chains, food webs and biomass.	Students post and discuss data collected at Kailua Bay. Lab activity: Students examine and classify plankton samples taken at that site.
DAY 9 Thursday	Morning	Marine Organisms - Overview Taxonomy & Cladistics Text Chapter 13, 14, 15	Activity: Students prepare practice terrestrial/aquatic cladograms based on major body plans. Students will properly classify Marine life forms by major phyla.
	Afternoon	Marine Invertebrates – Overview. Echinoderms, arthropods (crustaceans), and mollusks. Chapter 15	Lab Dissection: Representative marine invertebrates species – clam, starfish, blue crab and squid
	Evening	Tidal effects on marine life and marine communities of the intertidal zones. Text Chapter 16	Field trip preparation and review of field station protocols and tide pool observations.
DAY 10 Friday	Morning	Field testing and on-site sample analysis and plankton collection at Sharks Cove	Field testing and sample analysis at Sharks Cove. Students leave campus at 9:00 am and work on-site until 2:30 pm.
	Afternoon	Field testing and on-site sample analysis at Sharks Cove.	Students complete field trip sheets and return to HPU.

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Sunday	Evening	Filed Trip debriefing Summary of Marine Productivity.	Students post and discuss data collected at Shark's Cove. Lab activity: Students examine and classify plankton samples taken at that site.
DAY 11 Monday	Morning	Marine Vertebrates – Overview Introduction to the bony fish, cartilaginous fish, marine reptiles, birds, and mammals. Topic of focus – Comparative external morphology, anatomy and physiology of freshwater and saltwater bony fish. Text Chapter 15	Research: Students examine and report on the physical adaptations required for successful living in a marine environment. Video short "The Many Forms of Fish". Lab Activity: Students will read results of simulated freshwater vs. saltwater fish physiology lab (to be read on Day 6)
	Afternoon	Comparative Anatomy of Bony Fish and Cartilaginous Fish (Sharks, skates & rays) Text Chapter 15	Lab Dissection: Osteitchthyes (perch) and Chondrichthyes (dogfish sharks). Students prepare comparative anatomical reference plates
	Evening	Marine Mammals Test Chapter 15	Video short: "Dolphins, The Wild Side"
DAY 12 Tuesday	Morning	Hawaiian fish identification and classification. Waikiki Aquarium educational trip.	Student field trip to Waikiki Aquarium. Students leave campus at 9:00 Am and return at 3:00 pm.
	Afternoon	Waikiki Aquarium trip continue	Students complete field trip sheets and return to HPU.
	Evening	Filed Trip debriefing Summary of Marine Productivity. Food chains, food webs and	Students discuss and share information collected at Waikiki Aquarium
DAY 13 Thursday	Morning	Field testing and on-site sample analysis and plankton collection at Hanauma Bay	Field testing and sample analysis at Hanauma Bay. Students will snorkel and take underwater photos of native flora and fauna on the local reef. Students leave campus at 9:00 Am and work on-site until 2:30 pm.
	Afternoon	Field testing, on-site sample analysis and photography at Hanauma Bay..	Students complete field trip sheets and return to HPU.
	Evening	Filed Trip debriefing Summary of Coral Reef habitats Text Chapter 17-18.	Students post and discuss data collected at Hanauma Bay. Students prepare comparative summary of the field sites visited and consolidate for presentation the data

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DAY 14 Thursday	Morning	Marine resources, marine pollution 10, 20 and 50 year scenarios Text Chapter 17-18	Roles Debate: Students will do group debate 10, 20 and 50 year scenarios.
	Afternoon	Students will demonstrate competence in the basic course concepts and topics covered in Biological Oceanography.	Activity: Students will map marine pollutants in a simulated lab Biological Oceanography Assessment (Curriculum day 6-14)
	Evening	Dance	Dance
DAY 15 Friday	Morning	Video: “Blue Planet Series”	Students leaving site
	Afternoon	Video: “Blue Planet Series”	Students leaving site
	Evening	Pau	