Course Title:	Ecology of Infectious Disease and Symbiosis
Proposed Course Number:	OCN 340
Prerequisites:	Biol 171, 172, or consent of instructor.
Course Format:	Lecture
Instructor:	Andrea Jani Department of Oceanography office: Biomed Tower 311 (knock loudly, there is an anteroom) email: jania@hawaii.edu
Office hours:	Tuesdays & Thursdays, 1:15-2:00, or by appointment.

Course Description:
Microbes, both beneficial and harmful, are ubiquitous inhabitants of humans, other animals, and plants. In this course we will explore the ecology of infectious diseases, their impact on humans and wildlife, and the effects of human activities on disease spread and transmission. We will begin with basic ecology of infectious disease, including concepts of transmission, virulence, density dependence, and the continuum of symbioses from harmless to disease-causing infections. Building on these concepts, students will learn how human-mediated activities such as transport, travel, and environmental change can affect disease transmission. Case studies will be used to illustrate how biology, environment, and human activities combine to affect disease transmission. Students will learn about diseases of both humans and wildlife, in terrestrial, freshwater, and marine ecosystems, with an emphasis on diseases that are locally relevant to Hawaii.

Learning Objectives:
Through this course, students will gain a fundamental understanding of ecological factors that affect the transmission of infectious diseases and their impacts. Students will learn to think critically about the interplay between individual decisions and the larger scale population level consequences for disease risk, and will be asked to consider the ethics of such decisions. This course will emphasize interdisciplinary thinking by illustrating the links between human activities, environmental factors, and disease transmission (biological and ecological processes). This course will use case studies to emphasize the impacts of infectious disease in Hawaii.

Course Format:
This is a lecture based course, but student participation is expected and encouraged through in-class discussions. Student evaluation (grades) will be based on assignments (readings, group project, and in-class activities), quizzes, two midterms, and one final examination. Students are expected to read all required readings *before* coming to class.

Tentative schedule of topics

Week 1	Tu	Jan. 9	Introduction: What is disease ecology and why should I care?
	Th	Jan. 11	Plague and climate change.
Week 2	Tu	Jan. 16	Prairie dogs, plague, and ecosystem impacts
	Th	Jan. 18	In class exercise: how to get something out of scientific literature.
Week 3	Tu	Jan. 23	Antibiotics: Origins, how they work, and how they changed the course of history.

	Th	Jan. 25	Antibiotic resistance. Case example: Tuberculosis
Week 4	Tu	Jan. 30	Curbing antibiotic resistance
	Th	Feb. 1	Vaccines and herd immunity. Case example: Measles, Mumps
Week 5	Tu	Feb. 6	SIR models
	Th	Feb. 8	review
Week 6	Tu	Feb. 13	midterm 1
	Th	Feb. 15	Disease Dilution. Case example: Lyme Disease
Week 7	Tu	Feb. 20	Emerging Infectious Diseases (EIDs): Zika.
	Th	Feb. 22	Multiple-strain infections: Dengue. Outbreaks in Hawaii.
Week 8	Tu	Feb. 27	Symbiosis: mutualism, parasitism, and everything in between.
	Th	Mar. 1	Intro to the microbiome, from humans to honeybees
Week 9	Tu	Mar. 6	prep for library workshop
	Th	Mar. 8	library workshop
Week 10	Tu	Mar. 13	Ecology of Leptospirosis in Hawaii - Guest lecture by Professor Amber Wright.
	Th	Mar. 15	review
Week 11	Tu	Mar. 20	midterm 2
	Th	Mar. 22	work on group project
Week 12	Tu	Mar. 27	Spring Break
	Th	Mar. 29	Spring Break
Week 13	Tu	Apr. 3	Avian Malaria in Hawaiian birds - Guest lecture by Professor Matthew Madeiros
	Th	Apr. 5	Rapid Ohia Death
Week 14	Tu	Apr. 10	present group projects
	Th	Apr. 12	Salmon lice: Connections between fisheries and wildlife.
Week 15	Tu	Apr. 17	In class exercise: how to get something out of scientific literature, Part II.
	Th	Apr. 19	Wildlife disease and symbiosis. Case example: Chytridiomycosis
Week 16	Tu	Apr. 24	Coral infectious diseases
	Th	Apr. 26	Coral dysbiosis and human drivers of alternate stable states.
Week 17	Tu	May 1	review