

Ecology of Pelagic Marine Animals (OCN627) SAMPLE SYLLABUS

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Syllabus schedule subject to change

Course Goals – The pelagic environment is the largest on the planet, comprising the water column from coastal waters to the deep sea. Its inhabitants are varied and its communities are often complex, adapted to the particular characteristics of their habitat. Thus the subject is extremely large. Your marine microbiology course will have already covered microbial ecology, phytoplankton dynamics, primary productivity, and ocean biogeochemistry. The present course will cover a variety of major topics from zooplankton ecology to fisheries science. Its goal is to provide you with a basic understanding of what we know and don't know about the ecology and biology of pelagic marine animals (zooplankton through whales), the methods used in the field, and to create a forum for discussion of the major current questions.

Student Learning Outcomes – At the end of this course you will be able to:

- 1) Identify the major groups of pelagic zooplankton and nekton.
- 2) Understand the basic biology of pelagic animals and their adaptations to their environment.
- 3) Compare and contrast various sampling methods and be familiar with some basic instruments and methods in the field and laboratory.
- 4) Discuss temporal and spatial variations in pelagic ecosystems.
- 5) Evaluate the potential impacts of anthropogenic activities on pelagic communities.
- 6) Synthesize a body of literature on a topic and communicate a clear synopsis of the background, controversies, and future directions for research.

Required text and readings -

Miller CB and Wheeler PA (2012) **Biological Oceanography**. Blackwell Science Ltd

Readings will be assigned each week from the primary literature. For each lecture we give a bibliography that will include sources for general overviews (i.e. textbooks and review papers) and primary literature sources for delving deeper into the subject.

Suggested texts - general texts that you may want to use for general reference. If your research area is at all related to the class, I recommend that you obtain a copy.

Jennings S, Kaiser MJ, Reynolds JD (2001) **Marine Fisheries Ecology**. Blackwell Science Ltd.

Herring, P. J. 2002. **The Biology of the Deep Ocean**. Oxford University Press.

Office hours –We don't have formal office hours, but please feel free to drop by our office/labs if you have questions or would like to discuss a topic. You are also welcome to email us, but please do not expect an immediate response.

<u>Week</u>	<u>Lecture topic</u>
<u>Introduction</u>	
1	Introduction to the pelagic realm Zooplankton - organisms and communities
2	Zooplankton reproduction, life histories and population dynamics Gelatinous plankton – in-class discussion
3	Diel vertical migration Zooplankton and the biological pump – in-class discussion
4	Zooplankton feeding Zooplankton feeding – in-class discussion
5	Zooplankton growth and production Plastic ingestion and interactions in pelagic food webs - in-class discussion
6	Sampling the zooplankton – hybrid lecture/discussion Biogeography and biodiversity
7	Adaptation to global change – in-class discussion Temporal dynamics in pelagic ecosystems
8	Ocean acidification – in-class discussion MIDTERM EXAM
9	Nekton biology – life history and feeding strategies Trophic ecology – biomarker approaches
10	Trophic ecology and food webs (lecture online) Locomotion (lecture online)
11	spring break spring break
12	Kuhio Day Holiday – no class Vertical connections in pelagic food webs – in-class discussion
13	Buoyancy and camouflage Vision and bioluminescence in the deep sea
14	Reproductive and energetic strategies of deep-sea pelagic animals Spatial pattern in pelagic communities
15	Effects of anthropogenic climate change on pelagic animals

Climate change/Oxygen minimum zones – in-class discussion

16 Fisheries oceanography and recruitment
Fisheries stock assessment, management

17 State of global fisheries
Fisheries – in class discussion

FINAL EXAM

Grading Scheme

Midterm (EG)	125 points
Final Exam (JD)	125 points
Lab exercises	2x25 points
Lab practicals	2x35 points
Discussion Participation	50 points
<u>Presentation</u>	<u>100 points</u>
Total	520 points

Lab Exercises

- 1 – Zooplankton molecular ecology lab – due Feb 28th in lab
- 2 – Nekton feeding and diet analysis – due Apr 11th in lab

Lab practicals

Lab exams to test your ability to identify various zooplankton and nekton
~50 questions – timed
Zooplankton material stored in MSB634 (Goetze Lab), a key will be available
Nekton material stored in MSB604 (Drazen lab), a key will be available

Student presentations

15 minutes
Presentation (powerpoint file) with bibliography due at time of presentation
Evaluation by your peers and instructor
Topic (a question or controversy) due March 7th
Presentations during lab on Apr 18th

Lab Topics and Schedule

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The lab component of this course will provide you with hands on learning opportunities that can not be served in the classroom. It will introduce you to the diversity of pelagic animals, give you direct experience with the pelagic habitat, and provide a forum for discussion and presentations.

Week	Lab topic
1	No lab
2	Zooplankton diversity
3	Zooplankton diversity, cont.
4	Zooplankton LAB PRACTICAL
5	Molecular ecology lab – assignment given
6	Molecular ecology lab 2
7	Pelagic fish diversity
8	Pelagic fish diversity, cont. Molecular ecology lab assignment due
9	Nekton LAB PRACTICAL (MSB604) Presentation topic paragraph due via email
10	Instructor at sea – no lab
11	Spring break
12	Nekton feeding and diet analysis – lab exercise assigned
13	SATURDAY - blue water snorkeling field trip
14	Deep-sea adaptations lab
15	Potential threats from ocean mining - discussion Nekton Feeding Lab exercise due
16	STUDENT PRESENTATIONS (early start if schedules permit)
17	5:30am!!! Honolulu fish auction

Title IX

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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.

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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](tel:(808)956-2299) t9uhm@hawaii.edu