University of Oregon
Oregon Institute of Marine Biology
Biology of Fishes, Summer Term
Sample Syllabi

Course Description:

The course focuses on the comparative biology of fishes including general classification, trends in evolution, integrative, sensory and general physiology as well as bioenergetics, feeding ecology, reproduction, age and growth, and population dynamics as it relates to fisheries. The course emphasis will on the Pacific Coast ichthyofauna with an emphasis on the fishes of Oregon, however, principles will also be drawn globally. Lab exercises will emphasize collection and processing methodology, identification, and comparative morphology. Students will also complete several small research projects during the course of study in the lab and lecture. This course is intended for undergraduate sophomores, juniors, and seniors. Graduate students enrolled in this course will have additional course requirements commensurate with their level of study.

Course Outcomes

On completion of Biology of Fishes all students will be expected to have:

- A working knowledge of the general aspects of fish biology
- The ability to synthesize biology information spanning multiple areas (e.g., sensory physiology and migration behavior, fisheries management and population biology, anatomy and phylogeny, historical plate tectonics, glaciation, and zoogeography, etc.)
- Identify common and economically important species of fishes (in particular nearshore Pacific fishes) as well as demonstrate the ability to use dichotomous keys.
- Demonstrate practical laboratory skills for sampling of fishes, quantitative meristics and morphometrics. You will not leave the course until you can correctly measure a fish.
- Work on development of effective communication skills for scientific presentation
- On completion of Biology of Fishes, graduate students will also be able to draft, revise, and resubmit a grant proposal on a fish-related topic (aquaculture, fisheries, fish biology)

Required Text:

Helfman, G.S., B.B. Collette, D.E. Facey. The Diversity of Fishes, Blackwell Science, MA. (Available as a used text from online sources)

William N. Eschmeyer, Earl S. Herald. A Field Guide to Pacific Coast Fishes of North America: From the Gulf of Alaska to Baja California (Peterson Field Guides)

(Paperback). Widely available in many bookstores, but as cheap as 25¢ on Amazon.com.

Recommended References (Will be available as reference texts)

Bond C.E. Biology of Fishes Bond 2nd edition
Barton, ME, Bond's Biology of Fishes 3rd edition
Page, L.M and B.M. Burr. A Field Guide to Freshwater Fishes (Peterson Field Guide).(Paperback). Widely available in many bookstores, but as cheap as $1.00 on Amazon.com.

Good General Interest Fish Books

Kurlansky, Mark. Cod, A biography of the fish that changed the world

Moyle, P.B: Fish: An Enthusiasts Guide.

Supplies: You will need a Rite in the Rain field notebook, a box of No. 2H pencils and for laboratory sessions, a scalpel, tweezers, course and fine dissecting scissors, and a blunt probe. All of these can be purchased in the office. Rubber boots and raingear are essential (available at Walmart, Kmart, Home Depot, Lowes, etc.).

SAMPLE SYLLABUS **Biology of Fishes**

Week 1

Tuesday: Fishes from the outside: An introduction to fish diversity, and the terminology used to identify fish

Field trip and Laboratory – Beach Seine and identification of the catch. Processing of biological specimens. Meristics and Morphometrics

Thursday: Fishes from the Inside. An introduction to fish anatomy. Diversity in the skeletomuscular muscular system. Fish family presentations

Field Trip - Tide pool scavenger fishing derby. Prestigious award ceremony to follow

Week 2

Tuesday: Fishes from the inside: Physiology: Blood, Circulation, and Gas Exchange

Laboratory - Internal anatomy and anatomical responses to ecology. Fish Family presentations

Thursday: Osmoregulation and Nitrogen Excretion

Field trip- Daytime Otter trawl to examine demersal fishes in the Coos Bay region

Week 3

Tuesday: Buoyancy and locomotion

Laboratory - Sampling in a freshwater stream using electroshocking and other methods. Marking fishes for population studies. Fish family presentations

Thursday: Bioenergetics. Round table paper discussion, 1 page summary of paper due

Field trip - Swimming in fishes and analysis of trawl collections

Week 4

Tuesday: Feeding ecology I- Consumption Morphology, and Trophic dynamics. Fish Family presentations

Field trip – Fish Processing Plant tour. Discussion on obtaining fisheries samples from processors, commercial port sampling, and creel censuses

Thursday: Feeding ecology II.

Lab - Dissection and collection of data for feeding habits. Fish family presentations

Week 5

Tuesday: Mid-Term Exam

Field trip - Night Trawl and fish processing

Thursday: Sensory Biology I. Lateral line, hearing, and electro- and chemo-reception

Field trip - A return to the tide pools. Fish Family presentations

Week 6

Tuesday: Sensory Biology II. Vision and visual signals.

Laboratory - Round table paper discussion, 1 page summary due. Fish family presentations

Thursday: Orientation and Migration, Major paper due.

Field trip - Kelp bed Habitats. Fish Family presentations

Week 7

Tuesday: Fish reproduction and development

Laboratory - Sexual dimorphism, coloration, and Gyotaku. Fish family presentations

Thursday: Age and growth in fishes

Laboratory - determining ages in fishes, Round table paper discussion, and 1 page summary due. Fish family presentations

Week 8

Tuesday: Fisheries Management and Conservation

Laboratory Exam

Thursday Final Exam.