

# FISH520 ADVANCED ECOLOGY OF MARINE FISHES

## SPRING 2009

M/W/Th 10:30-11:20. Room 213

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Office Hours: By appointment

### COURSE WEB SITE:

<http://www.fish.washington.edu/classes/fish420/>

Everything you need for the course can be found on this web page.

### COURSE OBJECTIVES:

- (1) Foster critical analysis of contemporary theories of marine fish ecology
- (2) Provide a strong familiarity with the important primary literature
- (3) Appreciate the characteristics of marine environments and how they affect the ecology and life histories of marine fishes

### TEACHING PHILOSOPHY

My approach to teaching is to promote active learning in the classroom. My role in this course is to largely serve as a facilitator in your exploration of marine fish ecology. This includes providing the necessary background into each week's topics and moderating classroom discussions. Your role is to be an active, contributing member of the class.

### COURSE PREREQUISITES

This course presumes that you already have some background to appreciate the marine environment and the ecological processes that occur within it. Also, because much of this course is centered around critical analysis of contemporary scientific literature, it is imperative to have knowledge of basic statistical analyses. The best prepared students will have already taken a course in biological oceanography, ecology, fish biology, and statistics. If your course background is deficient in any of these areas, you may need to consult some introductory textbooks to get up to speed.

### COURSE CONTENT

The general format of the course will be alternating **lecture** (Mon / Wed) and **discussion** (Thursdays).

#### *In-Class Discussion*

Discussion sections will focus on critical analysis of primary journal articles, which have been selected to represent alternative views on particular topics. These articles are listed as "Required Reading" for each week.

Students may also post comments on the e-post site within 3 days of the discussion section to receive discussion credit.

*Paper Analysis:* I have provided additional papers for each topic in the syllabus. For each topic covered in the course, you will select one paper and write a 1 page summary of that paper. This summary must include the following elements:

- (1) A *brief* description of the study (what was done, why, and what was discovered)
- (2) A summary of how the work contributed to the body of theory on the subject
- (3) A critical assessment of the strengths and weaknesses of the work.

*Exams:* There will be two take home exams. You are encouraged to discuss your answers with other students, but the answers that you turn in must be your own. Duplicate or paraphrased exam answers will be considered a violation of the University policies on cheating, and any suspected cases of academic misconduct will be handled according to University regulations. It is **your responsibility** to *know and follow* University's policies on cheating and plagiarism; information, including definitions and examples of academic misconduct, can be found at <http://depts.washington.edu/grading/issue1/honesty.htm>.

## GRADING BREAKDOWN AND DUE DATES

<b>Assignment</b>	<b>Due Date</b>	<b>Points</b>
Mid-term Exam	May 8	150
Final Exam	June 8	150
Discussion (9 x 10 pts)		90
Paper Analysis (9 x 10 pts)	Monday, 9:00 am	90
<b>Total</b>		<b>480</b>

## GRADING

Your final grade is based on the total number of points using the following algorithm:

$$\text{Grade Point} = -4.1429 + 0.0179 \times \text{Points}$$

## LATE ASSIGNMENTS

All weekly reading summaries are to be turned in electronically or by hard copy by 9:00 am on the Monday following each assignment. The link to the electronic submission page can be found on the course web site. I have fiendishly configured the web site so that it will not accept late assignments. Late exams will be accepted with a 10 point penalty for each day beyond the due date.

## **COURSE SCHEDULE AND TOPICS:**

**Week 1: March 30-Apr 3.**

**Introduction to marine fish ecology; Biogeography of the sea and marine fish habitats**

**Week 2: Apr 6 – Apr 10**

**Life History Evolution in Marine Fishes:**

Patterns of life history traits, evolution of anadromy and catadromy, life history trade-offs, Growth-Maturity-Longevity approach

**Week 3: Apr 13 – Apr 17**

**Fish Growth and Body Size**

von Bertalanffy growth and allometric relations; Bioenergetics perspective; Evolutionary Perspective: Countergradient variation in growth. Compensatory growth. Ecological implications of body size.

**Week 4: Apr 20 – Apr 24**

**Population Dynamics of Marine Fishes**

Structure of marine populations. Open vs. closed populations. Population regulation.

**Week 5: Apr 27 – May 1**

**Early Life History and Recruitment: Hypotheses and Evidence**

Stock and recruitment. Critical period hypothesis. Match – mismatch hypothesis.

**Week 6: May 4 – May 8**

**Climate and bottom-up physical forcing**

Fisheries oceanography. Large- and small scale physical forcing. Regime shifts. Processes and mechanisms.

**Week 7: May 11 – May 15**

**Density dependence and competition**

Alternative models of competition. Lottery competition. Neutral theory. Mechanisms generating density dependence

**Week 8: May 18 – May 21**

**Predation and marine fishes**

Interactive effects of predation and competition. Importance of predation on marine fish populations.

**Week 9, May 25 – May 28**

**Fish in marine food webs**

Impacts of fishes in marine food webs; Evidence for generality of trophic cascades and top-down control;

**Week 10: June 1 – June 5**

**Ecosystem-Based Fisheries Management**

Issues, Methods and Challenges; Ecological Impacts of Fishing (food web and habitat effects); Applications in the Southern Ocean and North Sea; Prediction and irreducible uncertainties