**Syllabus Fall 2014**

**BIOL 5550 Ichthyology**

**Lectures:** Tue, Thur 12:30 - 13:45 Lecture Room: Howell N109

Dr. Joe Luczkovich, 252-328-9402

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**Textbook:** Helfman, G. S., B. B. Collette, D. E. Facey, and B.W. Bowen. 2009. The Diversity of Fishes. Biology, Evolution, and Ecology. Second Edition. Blackwell Science, Oxford, UK, ISBN 0-86542-256-7

**Ichthyology** is the study of fishes, including agnathans (jawless fishes), Chondrichthyes (sharks and rays – the cartilaginous fishes) and Teleostian fishes (Bony fishes). Fishes are the most diverse group of vertebrates, with over 25,000 species worldwide (and many more are described each year). The fishes are marvelously adapted to live in aquatic ecosystems, in which they play a major ecological role. The anatomy and physiology of fishes varies greatly from species to species, and their morphology has been adapted to the unique biological roles they play. The course will have a laboratory section, which will give the student “hands-on” experience with fishes in both the laboratory and the field. We will take numerous field trips to local aquatic environments (Pamlico and Tar Rivers, Pamlico Sound, and the Atlantic Ocean).

**Course Objectives:** The student will be able, at the end of the class, to:

* recognize the distinctions among jawless fishes, sharks, rays, and bony fishes
* identify and classify fishes into their major groups
* describe the evolution and phylogeny of fishes
* demonstrate knowledge of the anatomy and physiological processes of fishes
* understand the adaptations of fishes and the significance of these adaptations
* describe the ecological processes that involve fishes as predators, prey, competitors
* describe the behavioral processes that involve fishes in social groupings, reproduction
* describe the biological role of fishes in aquatic ecosystems
* describe the anthropogenic activities that affect fishes and how fishes can be conserved

**Grading:**

You are expected to attend all classes and to arrive on time. *There will be a series of unannounced quizzes in lecture.* Two examinations and a final exam will have essay and objective questions (multiple choice, fill in the blank, short definitions, etc.). Laboratory (BIOL

5551) scores will be included in the final grade for BIOL 5550. Scoring of exams and determination of the final grade will be as follows:

**Exam Score Possible Percentage of final grade**

Exam 1 100 12.5 %

Exam 2 100 12.5 %

Final Exam 200 25 %

Term Paper/Poster/Presentation 200 25 %

Lab (see BIOL 5551 syllabus for scoring) 200 25 %

Attendance/quizzes (extra credit) 80 10 %

**Total Points (+ Extra Credit Quizzes) 800 + 80 100 % + 10 % Extra Credit**

Thus, the letter grades will be determined as follows:

**Letter Grade Points needed (plus/minus using a 10-point scale)**

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| --- | --- | --- | --- | --- | --- |
|  | **A** | **B** | **C** | **D** | **F** |
| **Plus** |  | 696-719 | 616-639 | 536-559 | Below 480 |
|  | 752 or above | 664-695 | 584-615 | 504-535 |  |
| **Minus** | 720-751 | 640-663 | 560-583 | 480-503 |  |

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| **Date Lecture Topic Readings** |
| 26 Aug Introduction – What is a fish? Chapter 1 |
| 28 Aug Systematics of Fishes Chapter 2 |
| 02 Sep This is a Monday at ECU, no class today |
| 04 Sep Fish External Anatomy: Fins, Skin, Scales, Skeleton, Chapter 3 |
| 09 Sep Cladistic Analysis Chapter 2 |
| 11 Sep Soft Anatomy I Chapter 4 |
| 16 Sep Field trawling trip |
| 18 Sep Soft Anatomy II; Oxygen, Metabolism, and Energetics Chapter 5 |
| 23 Sep Sensory Systems I Chapter 6 |
| 25 Sep Sensory Systems II Chapter 6 |
| 30 Sep Homeostasis I (nervous system, endocrine system) Chapter 7 |
| 02 Oct Homeostasis II (endocrine system, ion balance) Chapter 7review for exam |
| 07 Oct **Exam 1** |
| 09 Oct Functional Morphology, Ecomorphology of Fishes Chapter 8  |
| 14 Oct Fall Break |
| 16 Oct Early Fish Life History; eggs& larvae Chapter 9;Juvenile fish ecology Chapter 10 |
| 21 Oct Age and Growth Chapters 5, 10 |
| 23 Oct Reproduction, Chapter 10, 21 |
| 28 Oct Evolution of fishes Chapter 11 |
| 30 Oct Sharks – Chondrichthyes Chapter 12 |
| 04 Nov Primitive fishes; Jawless fishes Chapter 13 |
| 06 Nov Nov Teleosts I - Bony Tongues, Elopiformes Chapter 14 |
| 11 Nov Teleosts II - Spiny Rayed Fishes Chapter 15 |
| 13 Nov Behavior and Ecology – Social interactions Chapter 21 |
| 18 Nov Fish in Communities and Ecosystems Chapter 24 |
| 20 Nov Ocean fish Ecology |
| 25 Nov **Exam 2**  |
| 27 Nov Thanksgiving Break |
| 02 Dec Reef fish Communities |
| 04 Dec Estuarine fish ecology |
| 09 Dec Student Presentations |
| 12 Dec Papers and Posters Due |
| 18 Dec Final Exam 11:00 - 13:30 |

**Term paper/poster/presentation** – all students will prepare a literature survey of a selected fish familiy or taxonomic group of fishes (Check for approval with me first). This 10-page, doublespaced, typewritten term paper should cover more than a single species (a family or higher taxonomic group), and should include primary literature references (from journals like *Copeia,* *Journal of Fish Biology, Transactions of the American Fisheries Society, Canadian Journal of*

*Fishery and Aquatic Sciences, Environmental Biology of Fishes*, etc.). You will need to cover some aspect of the evolution, physiology, anatomy, ecology, conservation or fisheries of the fish group you select. The format is that of a review article in *Copeia (See Guide to authors at http://www.asih.org/notice)*. You will summarize report this in an oral presentation, which will be shown to the class in Dec (I will select names at random to determine speaking order). Each person will describe their poster in a brief 15-min oral presentation (with 2 min for questions) in front of the class. A paper version of their poster will be submitted for grading (also email the file to me) and will be displayed. There is a poster printer in the department for this purpose.