

Objectives: **Biology of Fishes** covers the systematics, evolution, structure, function and biology of fishes. Emphasis will be placed on recent developments in systematics and evolution. The laboratory will provide hands-on experience with the morphological diversity of fishes.

Instructor: Phil Hastings; phastings@ucsd.edu
Office Hours: by appointment (Vaughan Hall 201; 822-2913)

Graduate Teaching Assistant: Zach Skelton; zskelton@ucsd.edu
Office hours: Thursday, 11:00-12:00 (Vaughan Hall 230)

Class Meetings: Lecture & Lab: Tuesday/Thursday, 2:00-5:50 (Vaughan Hall 147)

R/V Sproul Cruise: Full day Saturday or Sunday cruise (tentative: date to be determined)

Books & Readings

Required:

Hastings, P.A., H.J. Walker & G.R. Galland. 2014. *Fishes: A Guide To Their Diversity*. University of California Press. 311 pp. Copies at UCSD textbook center; e-book available at UC Press (<http://www.ucpress.edu/book.php?isbn=9780520283534>)
Helfman, G.S., B.B. Collette, D.E. Facey & B.W. Bowan. 2009. *The Diversity of Fishes. Biology, Evolution, and Ecology*. Blackwell Science, Ltd, Oxford. (2nd Edition)

Recommended:

Kells, V.A., Rocha, L.A. & Allen, L.G. 2016. *A Field Guide to Coastal Fishes: From Alaska to California*. Johns Hopkins Press.
Miller, D.J. & R.N. Lea. 1972. *Guide to the coastal marine fishes of California*. Calif. Fish Bull. 157:1-249.

Additional Readings: posted on TritonEd (TED) website

Important Dates (subject to change)

Lab Exam 1	2/5
Lecture Exam 1	2/12
Lab Exam 2	3/14
Final (Lecture Exam 2)	3/19 (Tuesday), 3:00-6:00 pm

Grading: Letter grades are roughly based on a percentage of 800 points

Lab exams: 2 x 150 = 300 points

Lab notebooks & assignments = 100 points

Lecture exams: 2 x 150 = 300 points

Research paper*: 100 points

A = 90-100%; B = 80-89%; C = 70-79%; D = 60-69%; E = < 60%

*Research paper details to follow

SIO 294, Biology of Fishes, Winter 2019, Lecture schedule (tentative)

Readings are from Helfman et al. 2009, *The Diversity of Fishes*

Other readings will be assigned as required

- Week 1. Diversity; Phylogenetic biology & classifications; Anatomy (Chap 3-4)
- Week 2. Early evolution of fishes (Chap 1-2); Agnathans; Gnathostomata (Chap 11)
- Week 3. Chondrichthyes; Biology of chondrichthyans (Chap 12)
- Week 4. Sarcopterygii; Actinopterygii; evolutionary trends (Chap 13)
- Week 5. Swimming (Chap 8, pp. 111-119); Sensory Systems (Chap 6)
- Week 6. Lecture EXAM 1. Feeding (Chap 8, pp. 119-126; Chap 19);
Respiration (Chap 5, pp. 57-64)
- Week 7. Reproduction (Chap 21)
- Week 8. Biogeography (Chap 16, pp. 329-338); Speciation (Chap 17)
- Week 9. Habitats (Chap 18)
- Week 10. Radiations (Chap 15, pp. 308-312; Chap 17, pp. 381-387)

SIO 294, Biology of Fishes, Winter 2019, Lab schedule

Groups are covered in Hastings et al. 2014, *Fishes: A Guide to Their Diversity*

- Week 1. Major groups of fishes; External anatomy of fishes; Osteology
- Week 2. Osteology (continued); Internal anatomy of fishes
Agnatha – jawless fishes
- Week 3. Osteology (continued)
Chondrichthyes – cartilaginous fishes
- Week 4. Osteichthyes – Bony fishes; Sarcopterygii – Lobe-finned fishes;
Actinopterygii 1 – Ray-finned fishes: Polypteriformes to Ostariophysii
- Week 5. **Lab exam 1**
Actinopterygii 2 – Ray-finned fishes: Argentiniformes to Beryciformes
- Week 6. Actinopterygii 3 – Ray-finned fishes: Mugiliformes to Scorpaeniformes
- Week 7. Actinopterygii 4 – Ray-finned fishes: Perciformes to Carangiformes
- Week 8. Actinopterygii 5 – Ray-finned fishes: Labriformes to Scombriformes
- Week 9. Actinopterygii 6 – Ray-finned fishes: Stromateiformes to Tetraodontiformes
- Week 10. **Lab exam 2**
Convergence; Local fishes
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