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[Ted Pietsch](#), Instructor, Office: Fisheries Teaching and Research, FTR 203. Telephone 543-8923, e-mail: twp@uw.edu. Office hours: just stop by or make an appointment via e-mail.

Alicia Godersky, Teaching Assistant for Lab Section AA, Wednesday-Friday afternoons; e-mail: garne113@uw.edu; assisted by Undergraduate Peer-TA Sydni Baumgart, e-mail: sydbaum@uw.edu. Office: the UW Fish Collection, Fisheries Teaching and Research, FTR 005. Office hours: TBA.

Jeremy Harris, Teaching Assistant for Lab Section AB, Tuesday-Thursday afternoons; e-mail: jph77@uw.edu. Office: the UW Fish Collection, Fisheries Teaching and Research, FTR 005. Office hours: TBA.

Sarah Friedman and Jennifer Gardner, Undergraduate Peer-Teaching Assistants for Lab Section AC, Tuesday-Thursday mornings. e-mail: sarahsea@uw.edu and jgardn92@uw.edu. Office: the UW Fish Collection, Fisheries Teaching and Research, FTR 005. Office hours: TBA.

• Organization and Scope •

Fish 311 is an introductory course designed to provide an overview of the wonderful world of fishes, their kinds and ways. We'll discuss and conduct a hands-on examination of the biology and diversity of living fishes of the world—from ancient bottom-living hagfishes and lampreys to modern-day sharks, rays, and bony fishes; from the freshwaters of Amazonia and to mangrove swamps and coral reefs; and from shallow-water lakes and streams to the deepest parts of the world's oceans.

• Schedule •

Lecture notes are available for download in pdf format ([Adobe Acrobat Reader](#) required). For "note-taking" format, click on "Notes."

Monday January 6	Introduction: organization and scope of the course; definitions; major themes: form, function, and biodiversity; major groups of fishes. Notes	Chapter 1
Wednesday January 8	1. Form: External anatomy; body shape and size; fins, spines, and scales; evolutionary trends in body form. Notes	Chapters 1, 3
Friday January 10	2. Biodiversity: Numbers and kinds of fishes; diversity through time; taxonomy, systematics, and classification; major groups of fishes. Notes	Chapter 2
Monday January 13	3. Form and function: Origin and kinds of bone; evolution of skeletal systems; functional units of the fish skeleton. Notes	Chapter 3
Wednesday January 15	4. Function: Locomotory mechanisms; anguilliform versus carangiform swimming; non-swimming locomotion; the functions of fins. Notes	Chapter 8
Friday January 17	5. Form and function: Airbladder evolution and structure; swimbladders and buoyancy; respiration and sound production. Notes	Chapter 4
Monday January 20	Holiday: Martin Luther King, Jr. Day	
Wednesday January 22	6. Biodiversity: Methods and goals of systematics; phenetics, evolutionary systematics, and cladistics. Notes	Chapter 2
Friday January 24	7. Biodiversity I: Jawless fishes; sharks and their allies; evolutionary successes and failures. Notes	Chapters 11, 12
Monday January 27	8. Biodiversity II: Primitive bony fishes and the rise of modern teleosts. Notes	Chapter 13
Wednesday January 29	Lecture Examination I	
Friday January 31	9. Form and function: Feeding modes and mechanisms; biomechanical considerations; upper jaw mobility and evolutionary success. Notes	Chapter 8
Monday February 3	10. Form and function: Feeding modes and mechanisms continued; how fishes get their mouths open and closed. Notes	Chapter 8
Wednesday February 5	Taxonomy, systematics, and fisheries management: North Pacific skates, rockfishes, and snailfishes as case studies.	
Friday February 7	11. Biodiversity III: Trends in teleost evolution; primitive teleosts and the rise of euteleost fishes. Notes	Chapter 8

Monday February 10	12. Biodiversity IV: Primitive euteleosts and the rise of acanthomorph fishes, Notes	Chapter 14
Wednesday February 12	13. Form and function: Modes of reproduction; functional anatomy; unique strategies and adaptations; parental care, Notes	Chapter 20
Friday February 14	14. Form and function: Osmoregulation, water and ionic balance in diverse aquatic environments, Notes	Chapter 7
Monday February 17	Holiday: President's Day	
Wednesday February 19	15. Function: Respiration; buccal and opercular pumps; structure and function of gills; air-breathing fishes, Notes	Chapter 5
Friday February 21	16. Biodiversity V: Acanthopterygian fishes and derivative orders; morphology, ecology, and co-evolution, Notes	Chapter 15
Monday February 24	17. Form, function, and biodiversity: Early life history, eggs and larvae, techniques and approaches, ontogeny and phylogeny, Notes	Chapter 9
Wednesday February 26	Lecture Examination II	
Friday February 28	18. Biodiversity VI: Sarcopterygian fishes; video on the story of Latimeria, Notes	Chapter 13
Monday March 3	19. Biodiversity VII: Deep-sea fishes; biodiversity and bioluminescence in Earth's largest ecosystem, Notes	Chapter 17
Wednesday March 5	20. Form and function, sensory perception I: Smell and taste, hearing and the acoustico-lateralis system, Notes	Chapter 6
Friday March 7	Otoliths: What are they, what do they do, and why are they important?	
Monday March 10	21. Form and function, sensory perception II: Eyes and vision; visual pigments and color vision, Notes	Chapter 6
Wednesday March 12	22. Form and function, sensory perception III: Electric organs and electroreception; object location and identification; electrocommunication, Notes	Chapter 6
Friday March 14	23. Biodiversity: Distribution and zoogeography; marine zoogeographic regions and barriers; dispersal versus vicariance, Notes	Chapter 16
Wednesday March 19	Comprehensive Final Examination 2:30-4:20 pm, FSH 102	

• Books •

While no single text is required for the course, it is highly recommended that you use the following as a supplement to the lecture and laboratory material: Gene S. Helfman, B. B. Collette, D. E. Facey, and B. W. Bowen. 2009. *The Diversity of Fishes: Biology, Evolution, and Ecology*. Second Edition. Blackwell Science, Malden, Massachusetts, xiv + 720 pp.

Another book that will be useful to you, especially if you are interested in knowing about the different kind of fishes, is the following: Nelson, Joseph S. 2006. *Fishes of the World*. John Wiley & Sons, Inc., Hoboken, New Jersey, xvii + 601 pp.

• Grades and Grading •

Lecture only		Lecture and laboratory	Points
Lecture Exam I	100	Lecture Exam I	100
Lecture Exam II	100	Lecture Exam II	100
Clicker quizzes	100	Clicker quizzes	100
Comprehensive Lecture Final	300	Comprehensive Lecture Final	300
		Midterm Lab Exam	100
		Laboratory Notebook	50
		Quizzes	50
		Comprehensive Lab Final	200
Totals	600		1000

• Helpful Files •

[Phylogeny Tutorial](#) (PDF)

[Phylogeny 1](#) (PDF)

[Phylogeny 2](#) (PDF)

[Trees](#) (PDF)

[Linnean Hierarchy](#) (PDF)

[Scientific Terminology](#) (PDF)

[Names and Naming](#) (PDF)

[Geological Time](#) (PDF)

[Anatomical Terminology](#) (PDF)

[Fossil Fishes](#) (PDF)

[Otoliths](#) (PDF)

[Sample Exam](#) (PDF)

• Links •

[UW Academic Conduct and Disability Information](#)

[Web of Science \(via UW Library\)](#)

[FishBase](#)

[Burke Museum](#)

[Gilbert Ichthyological Society](#)

[American Society of Ichthyologists
and Herpetologist](#)

[Marine Biology at UW](#)

[UW Fish Collection](#)

[Catalog of Fishes](#)

[SAFS Homepage](#)

[Vertebrate pages on the Tree of Life](#)

[UW Biology](#)

[NOAA's Ichthyoplankton
Information System](#)

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