

ICHTHYOLOGY – BIOL 4402-5402
FALL 2019

Instructor: Sean P. Graham, Assistant Professor
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Office Hours: T-Th 3:30-6pm, Fri 2-5pm or by appt.

Lecture: 11-15 M, W, F | WSB 107

Textbook: **None.** Recommended books: *The Diversity of Fishes*, 2nd ed. (2009). Helfman et al., Wiley-Blackwell. A well illustrated textbook of ichthyology. **My lectures are largely derived from this text.** *A Field Guide to Freshwater Fishes* Second Ed. Page and Burr. Houghton Mifflin, Peterson Field Guide Series) *A Field Guide to Atlantic Coast Fishes* (1986). Robbins et al. Houghton Mifflin, Peterson Field Guide Series *Freshwater Fishes of Texas* (2007). Thomas et al. Texas A&M Press.

Course description: Ichthyology is the study of fishes. Fishes are the most species rich group of vertebrates, and their evolution has included a spectacular series of transitions beginning nearly 500 million years ago. Fish are found in all aquatic environments from the deepest oceanic troughs to first order mountain streams, and from productive estuaries to tiny isolated desert springs. The evolution of fishes includes one of the most important transitions from the point of view of humans: the origin of tetrapods. Indeed, in this course you will learn that humans are— from an evolutionary standpoint— very successful terrestrial fish. This course will survey the origin, evolution, diversity, physiology, reproduction, and behavior of fishes. The laboratory component of this course will make use of preserved specimens and dissections to illustrate morphology, taxonomy, and other aspects of fish biology. The laboratory section will cover mostly anatomy and diversity of fish, with an emphasis on common Texas species and Trans Pecos freshwater fish. Extensive field trips will highlight local fish diversity, fish survey techniques, and how to catch a fish, clean it, and cook it. A separate syllabus is provided for the lab. Many materials associated with this course (e.g. this syllabus, lecture and lab handouts, grades) will be distributed through the Blackboard web site. **Check blackboard and your Sul Ross email frequently for materials and announcements!!!**

Student Learning Outcomes:

The biology student graduating with a BS in Biology should be able to:

SLO1 demonstrate an understanding of basic biological concepts, including but not limited to evolution via natural selection, cell theory, and the role and function of DNA.

SLO2 demonstrate utilization of various field techniques toward addressing scientific questions in the specific discipline. These field techniques can include, but are not limited to, plant collection and processing, various animal collection techniques, ecological surveying and sampling, and biodiversity indexing.

SLO3 use biological instrumentation to solve biological problems using standard observational strategies.

SLO4 develop writing skills by summarizing and critiquing recent relevant biological literature.

Student Learning Outcomes (SLOs) for Biology (Graduate):

1. Understanding and implementation of scientific methodology.
2. Utilization of field techniques toward addressing scientific questions
3. Be able to utilize statistics toward the analysis of data within the discipline.
4. Be able to effectively disseminate scientific findings using both written and oral communication.

Student Learning Objectives for this Course: We will focus primarily on SLO2 above, and in addition, at the end of the semester students should be able to

1. Sight-recognize common fish of Texas (especially those in the Trans Pecos), and know the habitat and range in which each would be encountered.
2. Know the orders, families, and common genera of North American freshwater fish.
3. Be familiar with the major groups of fish around the world.
4. Explain the basic external and internal anatomical/physiological features of fish.
5. Understand the reproductive biology of fish.
6. Comprehend relationships and phylogenies with respect to fish.
7. Use a standard field guide and key to identify fish.
8. Be familiar with basic field methods for sampling fish diversity
9. Know how to catch, clean, and cook a fish.

Attendance:

Attendance is mandatory. Lectures will not be posted on Blackboard so students must attend lectures to receive the material. Absences are excused only if students have a documented, university approved excuse (death in the family, illness, etc.). Students missing a class without a university approved excuse must get notes and other important information from a classmate. As per SRSU policy, any students missing 20% of lectures (7 lectures) over the course of the semester shall be dropped from the class with an F. **Students cannot miss exams, students missing any exam without notifying their instructor at least 24 hours in advance will receive a zero for that exam grade—no exceptions.** If the reason for missing an exam adheres to the university excused absences policy (a documented family or health emergency) the student may arrange with their instructor to take a makeup exam (the makeup exam will be different from the original exam). The student must take the makeup exam within seven days (including weekends) of the original exam date. If the student fails to appear (on time) for the makeup exam the student will receive a zero for that exam.

Grading:

3 lecture exams @ 100 pts ea 300

3 lab practicals @ 100 pts ea 300

Field Notebook/participation 50

Total Credit 650 points

Grades: A 90 – 100% B 80 – 89% C 70 – 79% D 60 – 69% F 0 – 59%

Class schedule (subject to change):

	Date	Topic
<i>Week 1</i>		
Lecture 1	Monday, August 26	Introduction: The Diversity of Fishes
Lecture 2	Wednesday, August 28	Phylogenetics

Lecture 3	Friday, August 30	Origin of Vertebrates
<i>Week 2</i>		
NO CLASS	Monday, September 2	Labor Day Holiday
Lecture 4	Wednesday, September 4	Early Evolution of Vertebrates
Lecture 5	Friday, September 6	Characteristics of modern Agnathans
<i>Week 3</i>		
Lecture 6	Monday, September 9	Characteristics of Modern Elasmobranchs
Lecture 7	Wednesday, September 11	Evolution of Sarcopterygians and Tetrapods
Lecture 8	Friday, September 13	
<i>Week 4</i>		Evolution of Actinopterygians
Lecture 9	Monday, September 16	Characteristics of Modern Teleosts
Lecture 10	Wednesday, September 18	
EXAM	Friday, September 20	EXAM 1
<i>Week 5</i>		
Lecture 11	Monday, September 23	Form and Movement
Lecture 12	Wednesday, September 25	Gas Exchange
Lecture 13	Friday, September 27	Osmoregulation
<i>Week 6</i>		
Lecture 14	Monday, September 30	Thermoregulation
Lecture 15	Wednesday, October 2	
Lecture 16	Friday, October 4	Cardiovascular Adaptations
<i>Week 7</i>		
Lecture 17	Monday, October 7	Endocrine System
Lecture 18	Wednesday, October 9	
Lecture 19	Friday, October 11	Nervous System
<i>Week 8</i>		
Lecture 19	Monday, October 14	Special Senses
Lecture 20	Wednesday, October 16	
Lecture 21	Friday, October 18	Behavior and Communication
<i>Week 9</i>		
Lecture 22	Monday, October 21	
Lecture 23	Wednesday, October 23	
EXAM 2	Friday, October 25	Exam 2
<i>Week 10</i>		
Lecture 25	Monday, October 28	Reproduction
Lecture 26	Wednesday, October 30	
Lecture 27	Friday, November 1	
<i>Week 11</i>		
Lecture 28	Monday, November 4	Mating systems
Lecture 29	Wednesday, November 6	
Lecture 30	Friday, November 8	Reproductive mode
<i>Week 12</i>		
NO CLASS	Monday, November 11	Veteran's Day Holiday – No Class
Lecture 31	Wednesday, November 13	Sex change, asexuality, and hermaphroditism
Lecture 32	Friday, November 15	Ecology: Zoogeography
<i>Week 13</i>		
Lecture 33	Monday, November 18	Ecology: Marine Fish

NO CLASS	Wednesday, November 20	Thanksgiving break
NO CLASS	Friday, November 22	Thanksgiving break
<i>Week 14</i>		
Lecture 34	Monday, November 25	Ecology: Reef Fish
Lecture 35	Wednesday, November 27	
Lecture 36	Friday, November 29	Ecology: Freshwater Fish
<i>Week 15</i>		
Lecture 37	Monday, December 2	Conservation of Fish
Lecture 38	Wednesday, December 4	
<i>Week 16</i>		
FINAL EXAM	Tuesday, December 10	(1015-1215) Exam 3

Note – Lecture topics are subject to change according to course interest, organization, and timing constraints.

Students with disabilities will be provided reasonable accommodations. If you would like to request such accommodations because of a physical, mental, or learning disability, please contact the ADA Coordinator for Program Accessibility at 837-8203, FH 112.