

BIOL 310 – Ichthyology (2,3) 3 cr. Fall 2011

Prerequisites: BIOL250 (Quantitative Biology)

Instructor: Dr. Geoffrey B. Steinhart, Assistant Professor
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Course website: www.lssu.edu/faculty/gsteinhart/GBS-LSSU/BIOL310-Ichthyology.html

Office Hours: Monday 1 - 4 PM and Tuesday and Thursday 10:30 - noon. Please feel free to stop by my office anytime. Other meeting times can be arranged as needed.

Meeting Times: Lecture: 11:00-11:50 AM, Monday and Wednesday, 306 Crawford Hall
Lab: 2:00-4:50 PM, Wednesday OR Thursday, 258 Crawford Hall

Required Texts: *Fishes: An introduction to Ichthyology, Fifth Edition* by P.B. Moyle and J.J. Cech, Jr.
Fishes of the Great Lakes Region, Revised Edition by C.L. Hubbs and K.F. Lagler

Copies of both texts and any required readings will be on reserve at the LSSU library or made available by other means. In addition, **you are required to bring your own sketch book or note cards, a sharp pencil, and an eraser** to all labs. Large cards or a sketch book are preferable.

Course Description: Study of the anatomy, physiology, behavior, taxonomy, and natural history of fishes, with emphasis on freshwater species, particularly those in the Great Lakes region.

Course Goals: This course covers form and function, taxonomy, identification, and classification with an emphasis on North American freshwater fish. The course provides hands-on experience collecting, archiving, identifying, and dissecting fish.

Course Objectives:

1. Learn about taxonomy and diversity of fishes across the world (assessment: species presentation and report, exams)
2. Understand the anatomy and physiology of fish (assessment: practicals and exams)
3. Learn identification of Michigan fishes and to spell their scientific names (assessment: practicals and quizzes)
4. Learn characters and keys to identify fishes (assessment: practicals, quizzes, drawings and key)
5. Understand how curate and archive specimens (assessment: staining exercise, field trips)

Participation and Conduct:

Learning is an active process, so participation is important for your success. Attendance is mandatory for all laboratory periods and **I expect to be notified in advance if you are unable to attend a lab period.** You will be graded on your participation (100 points, ~10% of your grade), so speak up. **Mobile phones cannot be used in class (including the labs) without prior permission.**

I want the class to be an open forum for discussion and learning: ask questions! If you are wondering about something, odds are there are other students wondering the same thing. Be critical evaluating what you hear and read, but be polite with your response. Students are expected to treat all students and lecturers with respect: do not interrupt somebody or make fun of someone's comment or question.

Key assignments:

Species presentation (50 pts.): You will select a fish from the class list and, during the lab period when we cover that species, you will give a short (~10 minute) presentation on your species. You must cover: 1) taxonomy, 2) identification, 3) distribution and status, 4) life history and ecology, 5) ecological and/or economic importance. See the book "Fishes of Wisconsin" and the course web site for examples.

Species report (100 pts.): You will select a different fish species and write a 5 to 7-page paper (1" margins, 12 point times or times new roman) on your fish's taxonomy and ecology. You can select any fish in the world, as long as you can find suitable descriptive information. Start by looking at fishbase.org. Your paper should follow a similar structure as your presentation (See the book "Fishes of Wisconsin"), but must be more in depth and include **at least five relevant, peer-reviewed** citations from articles, books, or agency reports (**no web sites!**). See the rubric on the course web site for information on scoring. You must include a **full-page, detailed drawing** of the fish in your report. You will have the opportunity to revise your paper for up to 10 additional points (not to exceed a total score of 100).

Species drawings (40 pts.), key, and quizzes (40 pts.): You will be required to draw all the fish we are identifying in lab (except the minnows, Cyprinidae). You should make the drawings from samples in the collection and include as much detail as possible. **You may use these drawings during quizzes, but not for practical exams.** Quizzes will involve identifying drawings and photographs, as well as answering short questions. Your drawings will be graded on completeness, neatness, and detail. For the minnows, you will make a dichotomous key that may be used on the quiz **AND** the lab practical.

Grading:

Grades will be assigned, without curving, as:

A+ ≥ 98	88 $> B \geq 82$	72 $> C- \geq 70$
98 $> A \geq 92$	82 $> B- \geq 80$	70 $> D \geq 60$
92 $> A- \geq 90$	80 $> C+ \geq 78$	60 $> F$
90 $> B+ \geq 88$	78 $> C \geq 72$	

All written and lab assignments are due at the start of the class/lab period. If you cannot take an exam or turn in an assignment on time because of illness or emergency, it is your responsibility to contact me as soon as possible. Except for unusual circumstances, I expect to be notified before the exam or due date. Late assignments will be docked **10% for each late day**, at my discretion.

The Americans with Disabilities Act & Accommodations:

In compliance with Lake Superior State University policy and equal access laws, disability-related accommodations or services are available to students with disabilities. Students who desire such services should meet with professors in a timely manner, preferably during the first week of class, to discuss disability-related needs. Students are eligible to receive services after they are registered with Disability Services. Proper registration allows Disability Services to verify the disability and determine individual reasonable academic accommodations. Disability Service is located in the KJS Library Room 103, 906-635-2355 (from on campus - 2355). Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss specific needs.

IPASS (Individual Plan for Academic Student Success):

If at mid-term your grades reflect that you are at risk for failing some or all of your classes, you will be contacted by a representative of IPASS. The IPASS program is designed to help you gain control over your learning through pro-active communication and goal-setting, the development of intentional learning skills and study habits, and personal accountability. IPASS is located in the KJS Library, Room 106, (906)

635-2887 or x2294 on campus, or email ipass@lssu.edu if you would like to sign up early in the semester or if you have any questions or concerns.

Honor Pledge:

As a student of Lake Superior State University, you have pledged to support the Student Honor Code of the College of Engineering & Technology. You will refrain from any form of academic dishonesty or deception such as cheating, stealing, plagiarism or lying on take-home assignments, homework, computer programs, lab reports, quizzes, tests or exams which are Honor Code violations. Furthermore, you understand and accept the potential consequences of punishable behavior.

Assignments and due dates

Due date	Assignment	Point value
Sep. 21, 22	Fish ID Collection	20
Oct. 3	Lecture exam 1	100
Oct. 5, 6	Lab practical 1	100
Nov. 2, 3	Lab practical 2	100
Nov. 7	Lecture exam 2	100
Nov. 16, 17	Staining exercise	50
Nov. 21	Species report	100
Dec. 7, 8	Lab practical 3	100
Dec. 7, 8	Species drawings	40
Dec. 14	Final lecture exam	100
TBD	Species presentation	50
All term	Lab quizzes (4; 10 pts. each)	40
All term	Class participation	100
TOTAL		1000

Laboratory Outline

Topic/Activity	Date	Assignment
Field trip: fish collection and identification	Aug. 31, Sep. 1	
External anatomy, keys, sample preservation	Sep. 7, 8	
Field trip: fish collection and identification	Sep. 14, 15	
Internal anatomy and skeletal system, staining	Sep. 21, 22	Fish ID due
Fish ID 1: Early fishes	Sep. 28, 29	Staining
Lab practical 1	Oct. 5, 6	Staining
Fish ID 2: Suckers and catfish	Oct. 12, 13	Staining
Fish ID 3: Minnows	Oct. 19, 20	ID Quiz; staining
Fish ID 4: Salmonids	Oct. 26, 27	ID Quiz; staining
Lab practical 2	Nov. 2, 3	Staining
Fish ID 5: Pikes, killifish, topminnows, etc.	Nov. 9, 10	Staining
Fish ID 6: Sunfish	Nov. 16, 17	ID Quiz, staining due
Fish ID 7: Sculpin, perch, and darters	Nov. 30, Dec. 1	ID Quiz
Lab practical 3	Dec. 7, 8	Drawings due

Lecture Outline

Topic	Date	Readings
Introduction, course description, and history	Aug. 29	1-10; Agassiz
<u>Physiology</u> - External anatomy and skeletal system	Aug. 31	11-26
<u>MOVIE</u>	Sep. 7	
<u>Physiology</u> - Locomotion	Sep. 12	26-36
<u>Diversity</u> - Evolution of early fishes	Sep. 14	210-244
<u>Physiology</u> - Respiration	Sep. 19	37-50
<u>Diversity</u> - Hagfishes and lampreys	Sep. 21	245-254
<u>Physiology</u> - Circulatory system	Sep. 26	51-76
<u>Diversity</u> - Relict bony fishes	Sep. 28	275-284
Lecture exam 1	Oct. 3	
<u>Diversity</u> - Bonytongues, eels, and herrings	Oct. 5	285-298
<u>Physiology</u> - Maintaining buoyancy and temperature	Oct. 10	77-88
<u>Diversity</u> - Minnows, characins, and catfishes	Oct. 12	299-318
<u>Physiology</u> - Water and ion regulation	Oct. 17	89-110
<u>Diversity</u> - Chondrichthyes	Oct. 19	255-273
<u>Physiology</u> - Digestive system	Oct. 24	111-126
<u>Diversity</u> - Smelt, salmon, pike, and more	Oct. 26	319-348
<u>Physiology</u> - Sensing their environment	Oct. 31	167-186
<u>Ecology</u> - Migration and shoaling	Nov. 2	187-198
Lecture exam 2	Nov. 8	
<u>Diversity</u> - Mulletts, killifish, pipefish, and more	Nov. 9	349-376
<u>Ecology</u> - Social interactions	Nov. 14	198-207
<u>Diversity</u> - Perciformes I	Nov. 16	377-404
<u>Ecology</u> - Reproduction	Nov. 21	141-148; 151-165
<u>Diversity</u> - Perciformes II	Nov. 28	405-412
<u>Ecology</u> - Growth and early life history	Nov. 30	127-139; 148-151
<u>Zoogeography</u> - Freshwater fishes	Dec. 5	413-436
<u>Zoogeography</u> - Marine fishes	Dec. 7	437-453
Final lecture exam	Dec. 14	10AM - noon