

# BIOL 310 - Ichthyology

## Fall 2009

### Instructor

Dr. Geoffrey B. Steinhart, Assistant Professor

Office: 225 Crawford Hall

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Course website: [www.lssu.edu/faculty/gsteinhart/GBS-LSSU/BIOL310-Ichthyology.html](http://www.lssu.edu/faculty/gsteinhart/GBS-LSSU/BIOL310-Ichthyology.html)

### Meeting Times

Lecture: 11:00-11:50 AM, Monday and Wednesday, 363 Crawford Hall

Lab: 2:00-4:50 PM, Wednesday OR Thursday, 258 Crawford Hall

### 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.

### Course Description

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.

### Learning Outcomes and Assessment

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

### Readings

The required text for lecture is Fishes: An introduction to Ichthyology, Fifth Edition by P.B. Moyle and J.J. Cech, Jr. In addition, Fishes of the Great Lakes Region, Revised Edition by C.L. Hubbs and K.F. Lagler is a required text for the laboratory identification. 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 3x5 (or 5x7) note cards or sketch book, a sharp pencil, and an eraser to all labs.**

### Participation and Conduct

Learning is an active process, so participation is very important for your success. Attendance is mandatory for all scheduled laboratory periods, unless listed as optional, 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, be courteous, and be active. **Use of mobile phones will not be tolerated in class!**

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, 5) ecological and/or economic importance. See "Fishes of Wisconsin" and the course web site for examples of what you might include.

**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](http://fishbase.org). Your paper should follow a similar structure as your presentation (See "Fishes of Wisconsin"), but must be more in depth and include **at least five relevant, peer-reviewed** citations from articles, books, or agency reports. Grading will be based on: format, grammar, spelling, citations, and quality and thoroughness of your report. You must include a **full-page, detailed drawing** of the fish in your report.

**Species drawings (40 pts.), key, and quizzes (40 pts.):** Throughout the semester, you will be required to draw all the fish we are identifying in lab (except the minnows, Cyprinidae). It is in your best interest to make the drawings from samples in the collection and to include as much detail as possible. You may use these drawing during the lab quizzes but not for the practicals. Quizzes will involve identifying drawings and photographs, as well as answering short identification questions. At the end of the semester, your completed 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+ ≥ 97	87 > B ≥ 83	73 > C- ≥ 70
97 > A ≥ 93	83 > B- ≥ 80	70 > D ≥ 60
93 > A- ≥ 90	80 > C+ ≥ 77	60 > F
90 > B+ ≥ 87	77 > C ≥ 73	

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.

## Honor system

All assignments are to be entirely your own work, unless you are specifically told otherwise. All aspects of your course work are covered by the Honor system. Any suspected violation (e.g., cheating, plagiarism) will be promptly reported and appropriate action(s) will be taken according to Lake Superior State University policies. The faculty and students of LSSU will no tolerate any form of academic dishonesty.

## 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](mailto:ipass@lssu.edu) if you would like to sign up early in the semester or if you have any questions or concerns.

### Assignments and due dates

Due date	Assignment	Point value
Sep. 30	Morphometry exercise	20
Oct. 5	Lecture exam 1	100
Oct. 7, 8	Lab practical 1	100
Nov. 4, 5	Lab practical 2	100
Nov. 9	Lecture exam 2	100
Nov. 11, 12	Staining exercise	50
Nov. 23	Species report	100
Dec. 9, 10	Lab practical 3	100
Dec. 9, 10	Species drawings	40
TBA	Final lecture exam	100
TBD	Species presentation	50
All term	Lab quizzes (4; 10 pts. each)	40
All term	Class participation	100
<b>TOTAL</b>		<b>1000</b>

### Laboratory Outline

Topic/Activity	Week	Assignment
External anatomy, keys, sample preservation	1	
Field trip: fish collection and identification	2	
Internal anatomy, skeletal system, and morphometry	3	<b>Staining</b>
Field trip: fish collection and identification	4	<b>Staining</b>
Fish ID 1: Early fishes	5	<b>Morphometry due</b>
<b>Lab practical 1</b>	6	<b>Staining</b>
Fish ID 2: Suckers and catfish	7	<b>Staining</b>
Fish ID 3: Minnows	8	<b>Quiz; staining</b>
Fish ID 4: Salmonids	9	<b>Quiz; staining</b>
<b>Lab practical 2</b>	10	<b>Staining</b>
Fish ID 5: Pikes, killifish, topminnows, etc.	11	<b>Staining due</b>
Fish ID 6: Sunfish	12	<b>Quiz</b>
Fish ID 7: Sculpin, perch, and darters	13	<b>Quiz</b>
<b>Lab practical 3</b>	14	<b>Drawings due</b>

## Lecture Outline

Topic	Date	Readings
Introduction, course description, and history	Aug. 31	1-10; Agassiz
<u>Physiology</u> - External anatomy and skeletal system	Sep. 2	11-26
<u>Physiology</u> - Locomotion	Sep. 9	26-36
<u>Physiology</u> - Respiration	Sep. 14	37-50
<u>Diversity</u> - Evolution of early fishes	Sep. 16	210-244
<u>Physiology</u> - Circulatory system	Sep. 21	51-76
<u>Diversity</u> - Hagfishes and lampreys	Sep. 23	245-254
<u>Physiology</u> - Maintaining buoyancy and temperature	Sep. 28	77-88
<u>Diversity</u> - Relict bony fishes	Sep. 30	275-284
<b>Lecture exam 1</b>	Oct. 5	
<u>Diversity</u> - Bonytongues, eels, and herrings	Oct. 7	285-298
<u>Physiology</u> - Water and ion regulation	Oct. 12	89-110
<u>Diversity</u> - Minnows, characins, and catfishes	Oct. 14	299-318
<u>Physiology</u> - Digestive system	Oct. 19	111-126
<u>Diversity</u> - Chondrichthyes	Oct. 21	255-273
<u>Physiology</u> - Sensing their environment	Oct. 26	167-186
<u>Diversity</u> - Smelt, salmon, pike, and more	Oct. 28	319-348
<u>Ecology</u> - Migration and shoaling	Nov. 2	187-198
<u>Ecology</u> - Social interactions	Nov. 4	198-207
<b>Lecture exam 2</b>	Nov. 9	
<u>Diversity</u> - Mulletts, killifish, pipefish, and more	Nov. 11	349-376
<u>Ecology</u> - Reproduction	Nov. 16	141-148; 151-165
<u>Diversity</u> - Perciformes I	Nov. 18	377-404
<u>Ecology</u> - Growth and early life history	Nov. 23	127-139; 148-151
<u>Diversity</u> - Perciformes II	Nov. 30	405-412
<u>Zoogeography</u> - Freshwater fishes	Dec. 2	413-436
<u>Zoogeography</u> - Marine fishes	Dec. 7	437-453
<u>Zoogeography</u> - Special marine habitats: deep sea, polar	Dec. 9	585-606
<b>Final lecture exam</b>	TBA	