University of Wisconsin - Madison
Zoology/ Environmental Studies 510 - Ecology of Fishes
3 Credits
https://canvas.wisc.edu/courses/444396

Course Designations and Attributes
Breadth - Biological Sciences, counts toward the Natural Science requirement
Level - Intermediate
College of Letters and Science Credit - Counts as Liberal Arts and Science credit
College of Agricultural and Life Sciences Credit – Fulfills honors course requirement
Honors Credit available

Meeting Time and Location and Instructional Mode
All Lectures and Discussions will be **in-person and will NOT be recorded**
Lectures: Tuesday and Thursday: 9:55-10:45 a.m. in **Birge B302**
Discussion: Thursday: 1:30-3:00 p.m. in **Noland Hall Room 168**
Shedd Field Trip: Saturday, March 8: 6:00 a.m.-7:00 p.m.

Credit Hours:
This class is worth 3 credits, and the content is the equivalent of three one-hour class periods each week over the entire Spring Semester. The class has the expectation that students will work on course learning activities beyond attending Lectures and participating in Discussions and the Field Trip, such as reading and writing for assignments and studying, for 3-6 hours each week. This syllabus includes additional information about the schedule and expectations for student work.

Honors Credit:
This class can be taken for Honors Credit. Students must register for Honors Credit status, either when they first register for the class or during the early part of the semester after the class has started. Students taking the class for Honors will have three additional assignments (which hopefully will be interesting and fun…) beyond those of the rest of the class that should require 2-3 hours each. These will be provided early in the semester. Students can drop their Honors status through April 11, 2025, with no penalty if they decide they no longer want to pursue Honors Credit. If a student completes all Honors requirements and they earn at least a "B" for the class, they will receive Honors Credit. Taking the class for Honors will have no influence on their overall grade for the class.

Instructors:
Dr. Olaf Jensen – Associate Professor, Department of Integrative Biology: ojensen@wisc.edu
Dr. John Lyons – Curator of Fishes, University of Wisconsin Zoological Museum: jdlyons@wisc.edu
There are no Teaching Assistants for this course.
Please contact *both* instructors via email with any questions or concerns about class material. There will not be formal office hours, but the instructors will be available after class and will try to respond to emails as soon as possible. Specific questions about a particular lecture, discussion, or assignment should be directed to the instructor responsible for that activity, but please cc the other instructor in case the primary instructor is unavailable. If needed, the instructors will be happy to make an appointment to talk in-person or online. **All questions about assignments or quiz grades, notification of absences, or requests for extensions on assignments should be sent to both instructors.**

Course Description

An overview of interactions of fishes with their physical, chemical, and biotic environment, their behavioral, physiological, and community ecology, their interactions with other fishes and organisms, including people, and ichthyological and fisheries science.

Prerequisites

Enrollment is limited to students that have taken the following courses (or their equivalents): Biology/Botany/Zoology 152; or Biology/Zoology 101 AND 102; or Biology/Biocore 301 AND 302; in addition to Chemistry 103 AND 104; or Chemistry 109. If you are uncertain whether you have the appropriate academic background to take this class, please contact the instructors.

Course Website

https://canvas.wisc.edu/courses/444396

Course Learning Outcomes

At the end of the class, students will be able to:

- use facts to guide conceptual thinking and hypothesis testing about ecological systems
- use fish evolution, ecology, and conservation to produce an integrated perspective of fish biology
- summarize the diversity of fishes on Earth, including phylogenetic and geographic patterns
- analyze the relationship between form and function of individual fish and species
- place fishes in the context of the broader food web and ecological community
- describe the management and use of fishes by human society
- describe the conservation challenges faced by fishes now and in the future
- write clear, concise, and accurate scientific reports and make informative oral presentations

Grading

Online Video Introduction	1%
11 Weekly Quizzes (4 pts each; lowest score dropped)	40%
Discussion Presentations & Exercises (1 to 4 pts each)	14%
Ethics of Recreational Fishing Assignment	10%
Fishy Readings Book Report Assignment	10%
Shedd Aquarium or Alternative Assignment	15%
Fisheries Detective Assignment	10%

There will not be a final exam, although one is listed in the Timetable

Final Grades will be based on the following criteria:

90-100% = A
89 = AB
80-88 = B
79 = AB
70-78 = C
65-69 = D
< 65 = F

The instructors *may* adjust these categories slightly upwards (i.e., to the benefit of the students) if there are many students with scores just below a cut-off.

Quizzes:
There will be eleven *online* multiple-choice quizzes, each worth 4 points (see schedule at the end), but only the top ten quiz scores will be used to calculate the quiz portion of the final grade. Each quiz will have 4 questions and will focus on the most recent lectures (see schedule) but could also cover particularly important material from previous lectures. Questions will be drawn from a pool of many questions, so each student will have a different set of questions, and the identity of the correct answer (i.e., A, B, C, or D) will be randomized for each question each time it is used. Quizzes must be done individually; do not take quizzes together with other students. Quizzes will be made available online on Thursday and may be taken anytime between Thursday and Sunday (until 11:59 p.m.). Once a quiz is started, there will be **8 minutes** to complete it, and it will not be possible to pause or retake the quiz. **THERE WILL NOT BE A FINAL EXAM EVEN THOUGH ONE IS LISTED IN THE TIMETABLE.**

Written Assignments:

1. Ethics of Recreational Fishing Assignment **– due February 6**
2. Fishy Book Report – **due March 13**
3. Shedd Aquarium or Alternative Assignment – **due April 10**
4. Fisheries Detective Assignment – **due April 17**

Assignments will be posted on CANVAS with detailed instructions before the due date. Assignments must be done individually by each student; do not work together. Completed assignments are to be submitted on CANVAS by the end of the day (11:59 PM) on the due date.

Lectures: Lectures will be **in person each Tuesday and Thursday from 9:55-10:45 a.m. in Room B302 Birge Hall**. If a student must miss a class for illness or an unavoidable conflict, a pdf copy of the lecture PowerPoint will be made available in Canvas. Students are responsible for all material provided in Lecture, *even if it is not included in the PowerPoint presentation or written anywhere on the Canvas site*, so if a student must miss a lecture, they should check with the instructors or their classmates for any relevant information or announcements that were presented.

Discussion Sections: Discussion sections will be **in person each Thursday from 1:30-3:00 p.m. in Room 168 Noland and participation will be graded.** Presentations and exercises in the Discussion section (see schedule) will constitute 14% of the final grade. If a student must miss a Discussion section due to illness or an unavoidable conflict, they must notify the instructors. There is no make-up for missed Discussions, but if a student has an excused absence, they will not be penalized for Discussions they miss. **Students must bring their laptop or tablet to Discussion.**

At the beginning of the semester, all students will be divided into 8-10 groups of 8-12 for Discussion Group Presentations. Each group will be assigned two fishes, one freshwater species from Wisconsin, and one well-known marine species. Some Discussion sections will consist of group exercises to research and briefly present (~5 minutes) aspects of the biology of these two species (1 point each). These exercises will rely heavily on concepts from Lectures and from information from online sources including journal articles and a widely used repository of fish biology information: http://fishbase.org/.

During one of the last Discussions, each group will make a final presentation covering an interesting aspect of the biology of one of their two species. These presentations **must be completed in advance** and should be longer – 7-10 minutes – and better constructed and will count more towards the Discussion grade (4 points). Further information about these final presentations is provided on Canvas.

Laboratories

There are no laboratories associated with this course. The Ecology of Fishes Laboratory is a separate 2-credit course (Zoology/Environmental Studies 511) that must be registered for and taken separately.

Field Trip

There will be a ***mandatory***, ***all-day*** field trip to the Shedd Aquarium in Chicago on ***Saturday, March 8***. **Buses will be provided for transportation, but admission to the aquarium (~$30.00) is the responsibility of the student**. Please tell the instructors if the admission fee represents a hardship; *no one will be denied attendance because of financial issues*. Note the early departure (6 a.m.) and late return (~7 p.m.). Students who are unable to attend should contact the instructors as soon as possible so that there will be an accurate headcount of attendees and for an alternative assignment; the alternative assignments can only be done with the permission of the instructors. During the field trip, students will develop a research study and collect observational data on live fishes in the aquarium, and after they return, they will write a scientific paper describing their study and results. The paper will be worth 15 points. The field trip, research study, and writing assignment will be described in detail in handouts on Canvas and a Discussion section beforehand, and guidance for the paper (and the alternative assignment) will be given in a Discussion section after the trip. Although it is a long day and a challenging assignment, for many students this field trip is the highlight of the class.

Textbook

No textbook will be used. Individual readings for assignments will be posted as pdfs on the course website in Canvas.

Usage of Audio and Visual Recorded Lectures and Discussion Statement

Lecture and Discussion materials and recordings for the Ecology of Fishes class are protected intellectual property at UW-Madison. Students taking this course may access the materials and recordings for their personal use related to participation in this class. Students may also take notes solely for their personal use. Students may not copy or possess lecture materials and recordings outside of class activities, including posting them on internet sites or selling them to commercial entities. Students are also prohibited from providing or selling their personal notes to anyone else or being paid for taking notes by any person or commercial firm without the University's express written permission. Unauthorized use of these copyrighted Lecture and Discussion materials and recordings constitutes copyright infringement and may be addressed under the university's policies, UWS Chapters 14 and 17, governing student academic and non-academic misconduct.

How to Succeed in this Course

The best way succeed in this course is to attend all the Lectures, participate in all the Discussion sections and collaborate with your group and make presentations as assigned, go on the Field Trip, complete the quizzes and written assignments as scheduled, and do the assigned readings and study relevant materials outside of class. Contact the instructors sooner rather than later with questions or problems with any concepts or assignments. It is their job to help, and they want all students to learn and do well. If there are issues beyond their expertise or capabilities, the University has many other sources of help, and please take advantage of these, as appropriate:

- University Health Services
- Undergraduate Academic Advising and Career Services
- Office of the Registrar
- Office of Student Financial Aid
- Dean of Students Office

Student Rules, Rights, and Responsibilities

Quarantine or Isolation due to COVID-19

Students should continually monitor themselves for COVID-19 symptoms and get tested for the virus if they have symptoms or have been in close contact with someone with COVID-19. Students should reach out to the instructors as soon as possible if they become ill for any reason or need to isolate or quarantine. Students are strongly encouraged to communicate with their instructors concerning any illness and any anticipated absences from the course. If necessary, the instructors will work with students to provide alternative ways to complete the course work.

Course Evaluations

Students will be provided with an opportunity to evaluate this course and their learning experience via the Digital Course Evaluation (AEFIS). Students will receive an official email about two weeks prior to the end of the semester when the course evaluation becomes available. A link will be provided to log into the course evaluation and to complete and submit it anonymously. Student participation is an integral component of this course, and student feedback is important to the instructors who strongly encourage participation in the course evaluation.

Academic Calendar and Religious Observances

For information, see: https://secfac.wisc.edu/academic-calendar/#religious-observances

Academic Integrity Statement

By virtue of enrollment, each student agrees to uphold the high academic standards of the University of Wisconsin-Madison; academic misconduct is behavior that negatively impacts the integrity of the institution. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these previously listed acts are examples of misconduct which may result in disciplinary action. Examples of disciplinary action include, but are not limited to, failure on the assignment or course, written reprimand, disciplinary probation, suspension, or expulsion.

Accommodation for Students with Disabilities Statement

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodation for students with disabilities is a shared instructor and student responsibility. Students are expected to inform their instructors of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Instructors will work either directly with the student or in coordination with the McBurney Center to identify and provide reasonable instructional accommodation. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. (See: McBurney Disability Resource Center)

Diversity and Inclusion Statement

Diversity is a source of strength, creativity, and innovation for UW-Madison. The University values the contributions of each person and respects the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. The University commits to the

pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.

Schedule for Ecology of Fishes (Zoology/Environmental Studies 510) for Spring Semester, 2025

Week	Lec/*Disc*	Date	Topic	Instructor	Assignments/Quizzes
1	1	Jan 21	Introduction to the class and group assignments What is a fish?	Jensen/Lyons	
	2	Jan 23	Evolution & Systematics 1: Primitive Fishes	Lyons	
	A	*Jan 23*	*Discussion: Group – Fish in the news* ***(1 point)***	*Jensen*	
2	3	Jan 28	Evolution & Systematics 2: Advanced Fishes	Lyons	
	4	Jan 30	Evolution & Systematics 3: Taxonomy	Lyons	
	B	*Jan 30*	*Discussion: Getting a job or into graduate school in fisheries, aquatic sciences, & conservation*	*Jensen/Lyons*	***Quiz 1 available (L1-4)*** ***Online Video Introduction due***
3	5	Feb 4	Migration	Lyons	
	6	Feb 6	Reproduction	Lyons	
	C	*Feb 6*	*Discussion: Lyons Research – Conservation of Mexican Freshwater Fishes* ***(1 point)***	*Lyons*	***Ethics of Recreational Fishing Assignment due***
4	7	Feb 11	Social Behavior	Lyons	
	8	Feb 13	Morphology & Adaptations 1: Locomotion/Feeding	Jensen	
	D	*Feb 13*	*Discussion: Group – Migration, Reproduction, and Social Behavior of your fishes* ***(1 point)***	*Lyons*	***Quiz 2 available (L5-7)*** ***1st Honors Assignment due***
5	9	Feb 18	Morphology & Adaptations 2: Respiration	Jensen	
	10	Feb 20	Morphology & Adaptations 3: Osmoregulation	Jensen	
	E	Feb 20	*Discussion: Group – Adaptations of your Fishes to their Environment* ***(1 point)***	*Jensen*	***Quiz 3 available (L8-10)***
6	11	Feb 25	Fishes as Predators and Prey	Lyons	
	12	Feb 27	Food Webs	Jensen	
	F	*Feb 27*	*Discussion: Jensen Research – Ecology and Conservation of Asian Salmonids* ***(1 point)***	*Jensen*	***Quiz 4 available (L11-12)***
7	13	Mar 4	Fisheries	Lyons	
	14	Mar 6	Aquaculture	Lyons	
	G	*Mar 6*	*Discussion: Shedd Aquarium Field Trip preparation*	*Lyons*	***Quiz 5 available (L13-14)***
	Field Trip	**Mar 8 (Sat)**	**Field Trip to Shedd Aquarium in Chicago** (Transportation provided; admission ~$30.00)	Jensen/Lyons and 511 TA'S	***Mandatory attendance***
8	15	Mar 11	Fish-Habitat Relationships	Jensen	
	16	Mar 13	Diel Vertical Migration	Jensen	***Fishy Book Report due***
	H	*Mar 13*	*Discussion: Shedd Aquarium and Alternative Assignment review*	*Jensen*	***Quiz 6 available (L15-16)***
9	17	Mar 18	Growth	Jensen	
	18	Mar 20	Bioenergetics	Jensen	
	I	*Mar 20*	*Discussion: Using spreadsheets for mathematical modeling* ***(1 point)***	*Jensen*	***Quiz 7 available (L17-18)*** ***2nd Honors Assignment due***
10	--	Mar 25	SPRING BREAK No Lecture	NA	
	--	Mar 27	SPRING BREAK No Lecture	NA	
	--	*Mar 27*	*SPRING BREAK No Discussion*	*NA*	
11	19	Apr 1	Invasive Species	Jensen	
	20	Apr 3	Fish Population Dynamics	Jensen	
	J	*Apr 3*	*Von Bertalanffy modeling exercise* ***(1 point)***	*Jensen*	***Quiz 8 available (L19-20)***

12	21	Apr 8	Climate Change	Lyons	
	22	Apr 10	Mercury and other Contaminants	Jensen	
	K	*Apr 10*	*Discussion: Fisheries Detective Assignment review* ***(1 point)***	*Jensen*	***Quiz 9 available (L21-22)*** ***Shedd Aquarium (or Alternative) Assignment Due***
13	23	Apr 15	Dams: A Global Threat to Fish Habitat	Jensen	
	24	Apr 17	Challenges and Solutions in Fish Conservation	Jensen	
	L	*Apr 17*	*Discussion: Group – Final presentation on your freshwater or marine fish species* ***(4 pts)***	*Jensen/Lyons*	***Quiz 10 available (L23-24)*** ***Fisheries Detective Assignment due***
14	25	Apr 22	Amazing Fishy Places: Wisconsin	Lyons	
	26	Apr 24	Amazing Fishy Places: Amazon River Basin	Lyons	
	M	*Apr 24*	*Discussion: Group – Fish Jeopardy!* ***(2 pts)***	*Lyons*	***3rd Honors Assignment due***
15	27	Apr 29	Amazing Fishy Places: African Great Lakes	Lyons	
	28	May 1	Amazing Fishy Places: Coral Reefs	Lyons	
	N	*May 1*	*Discussion: Makeups (if needed)*	*Jensen/Lyons*	***Quiz 11 available (L25-28)***