University of Wisconsin - Madison
Zoology/ Environmental Studies 510 - Ecology of Fishes
3 Credits
https://canvas.wisc.edu/courses/324171

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

Meeting Time and Location and Instructional Mode
All Lectures and Discussions will be **in-person in Noland Hall Room 168**
Lectures: Tuesday and Thursday: 9:55-10:45 a.m.
Discussion: Thursday: 1:30-3:00 p.m.
Shedd Field Trip: Saturday, March 4: 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.

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 do not hesitate to contact either or both instructors via email with any questions or concerns. 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. If needed, the instructors will be happy to make an appointment to talk in-person or online.

Course description
An overview of interactions of fishes with their physical, chemical, and biotic environment, their behavioral, physiological, and community ecology, and fisheries science.

Requisites
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/324171

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%
Weekly Quizzes (4 pts each; top 10 of 12)	40%
Ethics of Recreational Fishing Assignment	10%
Fishy Readings Book Report Assignment	10%
Fish Population Dynamics Assignment	10%
Shedd Aquarium Assignment	15%
Discussion Group Presentations (1 or 4 pts each)	14%

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

Quizzes:

There will be twelve *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 10 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 23**
2. Fishy Readings Book Report Assignment – **due March 23**
3. Fish Population Dynamics Assignment – **due April 18**
4. Shedd Aquarium Assignment – **due April 20**

Assignments will be posted on CANVAS with detailed instructions well 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 168 Noland and attendance is mandatory**. If you must miss a class for illness or an unavoidable conflict, a pdf copy of the lecture PowerPoint will be made available in Canvas.

Discussion Sections: Discussion sections will be **in person each Thursday from 1:30-3:00 p.m. in Room 168 Noland and attendance is mandatory.** Presentations and exercises in the Discussion section (see schedule) will constitute 14% of the final grade. if you must miss a Discussion section due to illness or an unavoidable conflict, please see your instructors.

At the beginning of the semester all the students will be divided into 12 groups of 8-9 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 present aspects of the biology of these two species. 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/.

Typically, these exercises will start with 10 minutes of introduction by the instructors, 20 minutes of online research by each group separately to find specific information about their species and to prepare a PowerPoint (a template will be provided), and then 40 minutes during which each group will make a 5-minute presentation to all the students about what they found for their species. The group will be graded on the quality of the information and the clarity of their presentations (1 point each). **Bring your laptop to Discussion for creating and making your presentations.**

During the last three Discussions of the semester, each group will make a final synthesis presentation covering multiple aspects of the biology of their two species. These presentations **must be completed in advance and** will be longer – 10 minutes – and will count more towards the Discussion grade (4 points each). Further information about these final presentations will be provided during the semester.

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 4***. **Buses will be provided for transportation, but admission to the aquarium ($29.95) is the responsibility of the student**. Please see the instructors if the admission fee represents a hardship. Note the early departure and late return. Students who are unable to attend should contact the instructors as soon as possible for an alternative assignment. 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 field trip, research study, and writing assignment will be described in detail in a Discussion beforehand. Although 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 materials and recordings for Ecology of Fishes are protected intellectual property at UW-Madison. Students in 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, including posting on internet sites or selling 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 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. The instructors will work with the student 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.

Accommodations 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 accommodations 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 accommodations. 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 respect 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, 2023

Week	Lec/Disc	Date	Topic	Lecturer	Assignments/Quizzes
1	1	Jan 24	Introduction to the class & group assignments What is a fish?	Jensen, Lyons	
	2	Jan 26	Fish evolution and systematics – 1	Lyons	
	A	*Jan 26*	*Discussion: Group – Fish in the news* ***(1 point)***	*Jensen, Lyons*	
2	3	Jan 31	Fish evolution and systematics – 2	Lyons	
	4	Feb 2	Fish evolution and systematics – 3	Lyons	
	B	*Feb 2*	*Discussion: Getting a job or into grad school in fisheries, aquatic sciences, or conservation*	*Jensen, Lyons*	***Quiz 1 available (L1-4)*** ***Online Video Introduction due***
3	5	Feb 7	Morphology and adaptations – 1: Locomotion and Feeding	Jensen	
	6	Feb 9	Morphology and adaptations – 2: Respiration and Osmoregulation	Jensen	
	C	*Feb 9*	*Discussion: Group – Your fishes in their environment* ***(1 point)***	*Jensen, Lyons*	***Quiz 2 available (L5-6)***
4	7	Feb 14	Reproduction	Lyons	
	8	Feb 16	Migration	Lyons	
	D	*Feb 16*	*Discussion: Group – Reproduction and migration of your fishes* ***(1 point)***	*Jensen, Lyons*	***Quiz 3 available (L7-8)***
5	9	Feb 21	Social behavior	Lyons	
	10	Feb 23	Fishes as predators and prey	Lyons	***Ethics of Recreational Fishing Assignment due***
	E	Feb 23	*Discussion: Group – Social behavior and predation of your fishes* ***(1 point)***	*Jensen, Lyons*	***Quiz 4 available (L9-10)***
6	11	Feb 28	Fisheries	Lyons	
	12	Mar 2	Aquaculture	Lyons	
	F	*Mar 2*	*Discussion: Shedd Field Trip preparation*	*Jensen, Lyons*	***Quiz 5 available (L11-12)***
	Field Trip	**Mar 4 (Sat)**	**Field Trip to Shedd Aquarium in Chicago** (Transportation provided; admission $29.95)	Jensen, Lyons and 511 TA'S	***Mandatory attendance***
7	13	Mar 7	Fish-habitat relationships	Jensen	
	14	Mar 9	Diel vertical migration	Jensen	
	G	*Mar 9*	*Discussion: Shedd Field Trip follow-up and assignment review*	*Jensen, Lyons*	***Quiz 6 available (L13-14)***
8	--	Mar 14	SPRING BREAK No lecture	NA	
	--	Mar 16	SPRING BREAK No lecture	NA	
	--	Mar 16	SPRING BREAK No discussion	NA	
9	15	Mar 21	Food webs	Jensen	
	16	Mar 23	Invasive species	Jensen	***Fishy Book Report due***
	H	*Mar 23*	*Discussion: Using MS Excel or Google Sheets for mathematical modeling*	*Jensen, Lyons*	***Quiz 7 available (L15-16)***
10	17	Mar 28	Growth	Jensen	
	18	Mar 30	Bioenergetics modeling	Jensen	
	I	*Mar 30*	*Discussion: Group – Bioenergetics modeling of your fishes* ***(1 point)***	*Jensen, Lyons*	***Quiz 8 available (L17-18)***
11	19	Apr 4	Mercury and other contaminants in fish	Jensen	
	20	Apr 6	Fish Population Dynamics	Jensen	
	J	*Apr 6*	*Von Bertalanffy modeling exercise* ***(1 point)***	*Jensen, Lyons*	***Quiz 9 available (L19-20)***

12	21	Apr 11	Climate Change: Wisconsin fishes	Lyons	
	22	Apr 13	Climate Change: Complex responses	Jensen	
	K	*Apr 13*	*Discussion: Fish Population Dynamics assignment review*	*Jensen, Lyons*	***Quiz 10 available (L21-22)***
13	23	Apr 18	Dams: a global threat to fish habitat	Jensen	***Fish Population Dynamics Assignment due***
	24	Apr 20	Emerging challenges and solutions in fish conservation	Jensen	
	L	*Apr 20*	*Discussion: Group – Synthesis presentation on your marine fish species **(4 pts)***	*Jensen, Lyons*	***Quiz 11 available (L23-24)*** ***Shedd Field Trip Assignment due***
14	25	Apr 25	Amazing fishy places: Wisconsin	Lyons	
	26	Apr 27	Amazing fishy places: Amazon River basin	Lyons	
	M	*Apr 27*	*Discussion: Group – Synthesis presentation on your marine or freshwater fish species **(4 pts**)*	*Jensen, Lyons*	
15	27	May 2	Amazing fishy places: African Great Lakes	Lyons	
	28	May 4	Amazing fishy places: Coral reefs	Lyons	
	N	*May 4*	*Discussion: Group – Synthesis presentation on your freshwater fish species **(4 pts**)*	*Jensen, Lyons*	***Quiz 12 available (L25-28)***