ZO 472/ZO 473: Ichthyology and Lab
Spring 2024
Course Credit Hours: 4.000

Day/Time: TR 14:00-16:50

Meeting Location: Science Hall 050

- Instructor: Dr. Rachel Bowes
- School of Science and Math
- Office Location: Breukelman Science Hall 049
- Telephone: 620-341-5622
- Email: rbowes@emporia.edu
- Preferred Method of Contact: email

- Office Hours: MW 13:00 – 15:00, Additional office hours available by appointment

How to use this syllabus

This syllabus provides students with information specific to this course, and it also provides information about respective University policies. This document should be viewed as a course overview; it is not a contract and is subject to change as the semester evolves.

Disclaimer

This syllabus is subject to change in part at the discretion of the instructor in accordance with the University policies and guidelines.

Course Description

A study of the biology of fishes, emphasizing diversity and evolution, morphology, ecology, physiology, life history, behavior, systematics and biogeography. Laboratory work focuses on groups important in the local fauna.

Program Learning Outcomes

- Students will formulate testable hypotheses that distinguish between a number of plausible explanations.
- Students will be able to read, create, and interpret graphs of scientific data.

- Students can summarize and explain biological research in a clear, reasonable, and logical manner through written or verbal means.
- Students will demonstrate knowledge of the concepts and principles of fish biology.

Student Learning Outcomes

A primary objective of this course is to develop your ability to think critically about the world around you. During class you can expect to be called upon to: make inferences from observations, recognize assumptions, reason deductively, interpret data and evaluate arguments. YOU WILL BE AN ACTIVE, NOT PASSIVE, LEARNER. To develop your critical thinking skills we will use major biological concepts. (Biology BS Program Learning Outcomes ID, IE, IF, IG, IIA, & IIB)

Evolution is the thread that holds the discipline of biology together. The geneticist Theodosius Dobzansky once stated: "Nothing in biology makes sense except in the light of evolution." Unfortunately, evolution is widely misunderstood. Therefore, we will use an evolutionary approach in developing the other concepts addressed in the course.

Students are expected to show mastery in the broad area of ichthyology (fish biology), with special reference to evolutionary relationships, adaptive morphological attributes, biogeography, ecology, and physiology. Mastery is also required in laboratory and field-based activities, with an emphasis on anatomy and identification of fish species.

Students should be able to:

1. Distinguish families and higher taxonomic groups of fishes with respect to their physical features.
2. Draw patterns of phylogenetic relationships among various groups of fishes and to understand the evolutionary significance of features mapped on these phylogenetic trees.
3. Identify selected fish specimens to the level of species using standardized laboratory methods, dichotomous keys, and other descriptive literature.
4. Compare and contrast a variety of aquatic habitats with respect to kinds of fishes present, their physiological/ecological features, and biodiversity.
5. Describe the form and function of systems involved in food acquisition, locomotion and buoyancy control.

Class Protocol

Be on time, pay attention, and work hard. All students will be expected to attend class and are responsible for all material presented whether you are present or absent. Students should email the instructor prior to the start of class to inform them of any absences. There tends to be a strong correlation between class attendance and grade earned (Randy Moore,

et. al.2003., American Biology Teacher 65: 325-329.); students who skip classes generally do poorer than students with regular attendance and participation. Examinations will be based primarily on material presented in class.

Course Changes

The instructor reserves the right to make modifications/changes in the course as necessary for the purposes of instruction.

Required Texts/Readings Textbook

Required:

Cailliet, G., Love, M., and Ebeling, A. 1986. Fishes: A Field and Laboratory Manual on Their Structure, Identification and Natural History. Waveland Press. ISBN: 0-88133-908-3

Recommended:

Helfman, G.S., Collette, B.B., Facey, D.E. and B.W. Bowen. 2009. The Diversity of Fishes. Biology, Evolution and Ecology. Second or Third Edition. Wiley-Blackwell, New Jersey.

Student Instructions:

This course is part of the Hornet Textbook Bundle. The digital materials required for this course have been integrated with Canvas and can be found in the Course Materials link in your Canvas course. Please sign into Canvas to access your course and course materials.

Student Support:

Customer Care is available to help students with questions about accessing their course material or using their eTextbook. Be sure to share the information below with your students.

Customer Care is available 24 hours a day, seven days a week - 24/7.

- Open a ticket Online for the Customer Care team: https://tinyurl.com/customercarerequest
- Email the Customer Care team: bookstorecustomercare@bncollege.com
- Call the Customer Care team: 1-844-9-EBOOKS (1-844-932-6657)

We suggest that students provide Customer Care with their name, school email address, school, course information and screenshots of the issue if applicable.

Questions? Contact your Bookstore Manager

Mike McRell
mmcrell@emporia.edu
620.341.5847

Grading Criteria

The grading scale is as follows:

Points/ Percentage	Letter Grade	Grade Points	Interpretation
≥93%	A	4.00	A range denotes excellent performance
90-92.9%	A-	3.70	
87-89.9%	B+	3.30	
83-86.9%	B	3.00	B range denotes good performance
80-82.9%	B-	2.70	
77-79.9%	C+	2.30	
70-76.9%	C	2.00	C range denotes satisfactory performance
60-69.9%	D	1.00	D range denotes unsatisfactory performance
≤59.9%	F	0.00	

Make up exams will be given ONLY WITH PRIOR APPROVAL OF THE INSTRUCTOR. A missed exam scores as a 0. There is no extra credit.

Evaluations

Specimen Collection Contributions (50 pts each):

There are multiple ways to fulfill this class requirement. You will be taught ichthyological collection techniques that will provide us with opportunities to expand the teaching collection of fishes at ESU. Minimum requirements for contributions are as follows:

- Each student (50 pts): 2 cleared and stained specimens (small fishes). Detailed instructions will be provided. Procedures take a substantial amount of waiting time (weeks) to complete (but not much actual, hands-on time).
- Each student (50 pts): 20 properly catalogued jars of specimens from our collection here at ESU. We need to confirm the identity of the individuals in the jar, refill and relabel the jars, and add all the necessary and available information into the online digital catalogue.
- Pairs of students (50 pts): 10 properly PRESERVED and LABELED examples of fishes (species, not individuals) collected outside of normal class field trips. Each submission must include a detailed field and identification report (example will be provided). Because collection effort generally correlates well with relative rarity of a specimen, unique specimens submitted will be given greater remuneration. Points will be assigned for submission as follows: 10 pts-unique specimen (1 group only), 8 pts-rare specimen (2 groups only), 5 pts-uncommon specimen (4 groups or less), 3 pts-common specimen. Points in excess of 50 will be used as extra credit.

Attendance (150 pts total):

Be on time, pay attention, and work hard. All students will be expected to attend class and are responsible for all material presented whether you are present or absent. Students should email the instructor prior to the start of class to inform them of any absences. There tends to be a strong correlation between class attendance and grade earned (Randy Moore, et. al.2003., American Biology Teacher 65: 325-329.); students who skip classes generally do poorer than students with regular attendance and participation. Examinations will be based primarily on material presented in class, supplemented by the textbook.

Fish Keys (75 pts each):

Each student will be responsible for creating a key to Orders, Families, and KS Species of fishes. This can be a dichotomous key or a list of defining characteristics, but will need to include ALL listed fishes.

Adapt a fish (50 pts):

Each student will prepare a brief, 4-5 minute PowerPoint presentation on what "evolution" would change in an assigned fish to make them better adapted to a new assigned habitat. Presentations will be made to the class for peer evaluation during a lab period of the semester (April 25, 2024).

Exams (100 pts each):

All exams & quizzes will take place in person and take place on the date and at the time outlined in the class schedule. If you are unable to take an exam for a valid reason, please let me know through an email, I expect that I should know about such a conflict with reasonable prior notice (typically 1-2 weeks prior).

In this applied course learning to identify fish using various techniques is important. On the lab practicals, you will be responsible for recognizing as many as 50 specimens of fishes and providing the correct identification including ORDER, FAMILY, GENUS and SPECIES. There will be numerous opportunities to practice fish identification during the semester, but you need to get started early learning the scientific names. Other practical skills or facts are also fair game for examination. More details on this, including study materials, will be provided as the date nears.

Late Assignments, missed Assignments, Exams, and/or Class Absences

You are expected to attend and be an active participant in every class. In the absence of legitimate documentation for missing class (illness, family emergency, etc.), your participation grade will be docked accordingly. If you do have a justifiable reason for missing a class period, I will require appropriate documentation prior to the class, save for exceptional circumstances. All assignments are due on no later than 11:59pm on the due date. I am trying to teach you about fishes, not take points away from your final grade; if you have trouble with the homework, send me an email or come into office hours so I can help! Late homework will

incur a 50% penalty each day it is not turned in.

My guiding principle for illness is this: If you are sick or feel sick, you should not go to class or come to work. Stay home and take care of yourself. Students who are sick (with anything, not just COVID) and need to miss class should contact both the instructor before class (rbowes@emporia.edu) as well as the Office of Student Affairs, (VPSA@emporia.edu). This needs to occur every time a class must be missed due to illness. Communication is vitally important in these new circumstances, and it is my expectation that you will keep me informed of pertinent developments or changes in your circumstances.

Syllabus Policies and Student Resources

Academic Dishonesty Policy

Academic Dishonesty, a basis for disciplinary action, includes but is not limited to activities such as cheating and plagiarism (presenting as one's own the intellectual or creative accomplishments of another without giving credit to the source or sources). *In this course any acts of academic dishonesty will result in a failing grade for the assignment. Multiple infractions, or more egregious types of academic dishonesty may result in failure of the course and the assignment of an "XF" grade. Furthermore, any infraction will be reported to the Office of the Provost who may impose additional penalties.* The University policy is presented on the Academic Affairs website as the Academic Affairs Academic Dishonesty Policy

Student Accommodations

Student Accessibility and Support Services (SASS) at Emporia State University (ESU) ensures that students with disabilities have full and equal access to the programs and services of ESU without discrimination. Any student who feels they may need academic accommodations or access to accommodations based on the impact of a documented disability should contact and register with SASS during the first week of class or as soon as possible after the diagnosis of a disability. SASS is the official office to assist students through the process of disability verification and coordination of appropriate and reasonable accommodations. Students currently registered with SASS must obtain a new accommodation memo each semester. The SASS office is located in William Allen White Library, 2nd Floor (Office 209K) or phone 620-341-6637/Email SASS@emporia.edu. The SASS office website URL is http://www.emporia.edu/sass.

Diversity, Equity, and Inclusion

Emporia State University supports an inclusive learning environment where diversity and individual differences are understood, respected, appreciated, and recognized as a source of strength. We expect that students and faculty at Emporia State will respect differences and demonstrate diligence in understanding how identities, perspectives, behaviors, and worldviews may be different from their own. If there are aspects of this course that result in barriers to your inclusion or the inclusion of those around you, contact the individual with whom you are most comfortable: your academic advisor, the Department Chair, your School or College Dean, the Dean of Students, the Senior Director of Diversity, or your course instructor.

Acceptable Use Policy

It is University policy to provide computing and information technology resources to faculty, staff, students, official university affiliates, and others in support of the education, research, and public service missions of the university. Users of university information technology resources are responsible for using these resources only as allowed by law and in connection with the university's core teaching, research, service, and other identified missions. (resources: Usage Policy URL

https://sites.google.com/g.emporia.edu/emporiastateuniversity/usage-policy)

Confidentiality of Student Information (FERPA)

ESU affords students their full rights in conformity with the Family Educational Rights and Privacy Act of 1974, its amendments and implementing regulations. Eligible students have the right to inspect their educational records request amendment of their records they believe to be incorrect or misleading and restrict disclosure of their information in specific situations. Students may waive their rights to inspect and review confidential statements and confidential letters of recommendation by providing a signed voluntary statement if, in conformity with applicable law; 1) the student is notified, upon request, of the names of those providing statements and letters, 2) the letters and statements are only released for the original purposes stated, and 3) the waiver is not a condition of admission or other benefit. (resources: Information on FERPA URL https://www.emporia.edu/academics-majors/academic-affairs/office-registrar/enrollment-registration/student-and-family-educational-rights-and-privacy-act-1974-ferpa/)

Withdrawal

If a student elects to withdraw from one or more classes after the official drop period and through the tenth week of a regular semester, the grade of "W" will be recorded on the transcript regardless of the student's academic standing in that class. Students must have their advisor sign the withdrawal form.

After the tenth week of the regular semester the student may not withdraw from class nor may the instructor assign the grade of "W". In extreme cases, the student may appeal to the Office of the Associate Vice President for Academic Affairs to receive a grade of "W" after the tenth week.

Classes taught in less than the regular semester will follow a similar pattern. If a student elects to withdraw from one of these shorter classes after the official drop period and before 5/8 of the class periods have been completed, the grade of "W" will be recorded on the transcript. After 5/8 of the class periods have been completed, the student may not withdraw, nor may the instructor assign the grade of "W." In extreme cases, the student may appeal to the Office of the Associate Vice President of Academic Affairs to withdraw with the grade of "W" after 5/8 of the class periods have been completed.

Course Incompletes

If a student takes an Incomplete in the course, for a grade of I, the student's grade will be reduced by a grade level when the work is completed during the next semester. For example, an A grade will be reduced to a B grade. Incomplete work that is not finished by the end of the next semester automatically turns to an F (by the Registrar's Office). According to ESU policy, Incompletes can be assigned only in the direst of circumstances. The Teachers College may require a signed contract between the student and the professor to obtain an Incomplete grade.

Basic Needs

Basic needs insecurities can be barriers to students' success, which is why we need your help. As you complete your syllabi for the fall semester and prepare for the first day of class, we encourage you to share information about available campus and community resources with your students. Encourage students to visit emporia.edu/basicneeds to find resources for affordable housing, financial support, and food assistance.

We have identified strategies and resources instructors might find helpful in supporting students' basic needs and put together a faculty toolkit. Example strategies include posting about resources on Canvas, talking about them with students at various turning points throughout the semester, and adding a basic needs statement to syllabi, among many others. For a sample syllabus statement, see https://bit.ly/ESUbasicneedssyllabus. The *Basic Needs Coalition* is a group of students, faculty, staff, and community members who work together to ensure all Hornets have access to the resources they need to succeed inside and outside the classroom. If you have questions or concerns for the coalition, please email basicneeds@emporia.edu.

Campus Emergencies

In the event of a major course or campus emergency (such as a significant COVID-19 outbreak), the mode of instruction, course requirements, deadlines, and/or grading procedures are subject to changes that may be necessitated by a revised academic calendar or other circumstances beyond my control. In the event of such a circumstance, communication will occur through Canvas and by email from your instructor. You may also request information about changes in this course by emailing the instructor.

Hardships

If something happens during this course that makes it difficult or impossible for you to complete course work or attend class for an extended period of time, please inform the instructor immediately. Consideration for extenuating circumstances, may be granted by the instructor. There are campus resources dedicated to addressing student hardships and referrals to these resources may be obtained by contacting the Office of Student Affairs.

Student Health and Safety

To keep yourself and fellow members of the campus community safe, please screen yourself for symptoms of COVID-19 before attending class. Symptoms include headache, cough, shortness of breath or difficulty breathing, sore throat, new loss of smell or taste, chills, repeated shaking with chills, muscle aches and pains, among others. Please review posted signage for further instructions on how to self-screen. If you are experiencing any of these symptoms, please do not attend class. If you begin experiencing these symptoms during class, please exit the classroom. You should then return to your residence and notify the instructor of your absence. Contact the Student Wellness Center by calling 620-341-5222, if you believe you need testing or medical consultation.

Undergraduate vs. Graduate Credit

Undergraduate students enrolled in 700 level courses will receive undergraduate credit (not graduate credit) unless they have a previously approved senior rule application or dual/accelerated enrollment form on file in the Graduate School. Undergraduate credit earned in 700 level courses cannot later be counted toward a graduate degree.

Spring 2024 Class Schedule

Date	Topic/Activity	Chapter(s) in Textbook
Fish Form and Function		
January 16	-------	
January 18	Introduction, Basic External Anatomy	1
January 23	Basic Internal Anatomy; Dissections	2
January 25	Basic Internal Anatomy; Dissections	2
January 30	Basic Internal Anatomy; Dissections	2/13
February 1	Osteology, Muscles, Locomotion; Diaphonization	3/4
February 6	Functional Morphology	5
February 8	KNRC – No Class	
Fish Taxonomy		
February 13	Finding Characters; Keys to Orders, Families, and Species	6
February 15	Taxa ID	7
February 20	Shared Characters	8/9
February 22	Specimen Care; Specimen & Collection Contributions	11
February 27	Fish Diversity Overview	
February 29	Graduate Presentations	
March 5	Keys to Orders, Families, and Species; Specimen & Collection Contributions	
March 7	**Midterm Exam**	**1-9**
March 11 – 15	Spring Break – No Class	
Fish Natural History		
March 19	Age and Growth	12
March 21	Reproduction	14
March 26	Parasites and Diseases	15/16
March 28	Habitat; Graduate Literature Discussions	10
April 2	KS Fish ID, Keys to Orders, Families, and Species	
April 4	KS Fish ID, Keys to Orders, Families, and Species	

April 9	Field Sampling Techniques (Lakes)	
April 11	Field Sampling Techniques (Rivers)	
April 16	*Possible KU Field Trip*	
April 18	Keys to Orders, Families, and Species; Specimen & Collection Contributions	
April 23	Keys to Orders, Families, and Species; Specimen & Collection Contributions	
April 25	Adapt a Fish Presentations	
April 30	Review	
May 2	**Final Practical Exam (Field)**	
May 7, 15:10-17:00	**Final Practical Exam (Specimens)**	