EEB 474: Diversity, Ecology, and Evolution of Fishes
Fall 2023

Lecture Time and Place: Monday and Wednesday, 9:10 – 10:00 AM, NEB 400
Lab Time and Place: MW (Lauren Lyon) 10:30 am – 1:30 pm OR TR (Becca Smith) 9:50 am – 12:35 pm
Course Credit Hours: 4 hours Lecture and Lab

Teaching Team Contact Information:
Instructor: Benjamin P. Keck, PhD (he, him)
bkeck@utk.edu 203 Strong Hall

Student hours: 2:00 – 3:00 pm Monday or by appointment in my office (203 Strong Hall) or during and after labs. It’s best to start with an email with a day/times you could meet, and I will respond within 2 business days. When you email, put EEB 474 in the subject line and provide me with enough information to answer any questions. I highly encourage students to make appointments or use student hours.

Course website: You will find our class page on Canvas with lots of information. Tutorials on using Canvas. I recommend that you check Canvas frequently for new announcements and discussion threads. You will have one merged course site for the lecture and a group for your lab.

Course Description: Why are fishes so diverse? We will use the fish tree of life as a guide to explore evolutionary and ecological patterns, including anthropogenic, influencing the diversity of fishes. After an introduction to how we describe and classify fishes, we will focus on identifying the notable characteristics and geographic distributions of major lineages, the evolutionary mechanisms responsible, and how those can inform our broader understanding of evolution and ecology. We include the diversity of fishes worldwide, with an emphasis on fishes from eastern North America

Student Learning Goals for this Course:
Understand the basic biology of fish, their evolutionary history, and how to identify fishes from around the world, with a concentration on Tennessee fishes. The focus of this course is fishes, but many of the concepts we cover will be placed into a broader scientific context, including: 1) Evolution from origins in deep evolutionary time to recent ecological time-scales, 2) Functional morphology and environmental niche, 3) Interpreting patterns of gene flow and genetic methods, 4) Feeding strategies, and 5) Ecological roles and influences on human culture.
Learning Environment:
You will be attending lectures and labs in person and the course will require work outside of the designated meeting times. I will do my best to provide clear due dates, options for exam prep, reflection on study methods after the first lecture exam, and open communication through email and in person. In lecture I will try to foster an inclusive environment. If you have a preferred name or pronouns that are not included in your myUTK profile or that would show up in the class roster, let me know and I’ll make changes to my records. If you find a topic uncomfortable or question my delivery of a concept, I encourage you to talk with me about it (usually in person). Among all the students in this course there is a lot of life experience that many of us are naïve to, including me, so I encourage you to provide your perspectives and to listen to other’s perspectives. There will be multiple learning activities, often in groups (can be done individually), throughout the term.

Course Communications:
I will make weekly announcements in Canvas with information on the lectures, assignments, and other miscellany for the upcoming week. This is also where I’ll provide links to revised syllabi, study guides, and surveys. Make sure you check these regularly.

Course Website (Canvas): [http://utk.instructure.com/](http://utk.instructure.com/)
You will find our class page on Canvas with lots of information. Tutorials on using Canvas are available at [https://oit.utk.edu/teachingtools/online/](https://oit.utk.edu/teachingtools/online/). I recommend that you check Canvas frequently for new announcements and discussion threads. You will have one merged course site for the lecture and a group for your lab.

Email: bkeck@utk.edu
When you email, put EEB 474 in the subject line and provide me with enough information to answer any questions. I will respond within 2 business days, usually sooner. It’s also a good idea to check for recent announcements in Canvas that might address questions.

Attending student hours:
I highly encourage students to make appointments or join during student hours, individually or in small groups.

How to Be Successful in This Course:
I want you to succeed! I will do my best to make sure expectations and learning objectives are clear. I am here to help you in and out of lecture. I ask that you do your best to communicate with me when things go wrong or if you have concerns. Come to the student hours! I am happy to talk about concepts form class, work through examples, discuss study habits, or just talk about cool biology stuff! **Students that use the entire lab time do well! Those that leave after an hour do poorly!**

Student’s Responsibility
● Be prepared for all classes
● Be respectful of others
● Actively contribute to the learning activities in class
● Abide by the UT Honor Code

Instructor’s Responsibility
● Be prepared for all classes
● Evaluate all fairly and equally
● Be respectful of all students
● Create and facilitate meaningful learning activities
● Behave according to University codes of conduct
Required Texts:


Suggested Books:


Field Trips:
There will be a day trip to Little River during lab time the 6th and 7th of September. There may be an optional Fall Break trip to Florida, Lake Erie, or VIMS and these will be discussed in class.

How Your Learning Will Be Assessed:
I will use the standard UT grading scale, rounding up at .5%+ for each letter grade. Extra credit is only offered to the class as a whole. Any excuse or concern for absence or tardy work should be discussed in a timely manner. There is a total of 800 points available during the course.

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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<tbody>
<tr>
<td>Lecture Book Chapter</td>
<td>40</td>
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<tr>
<td>Lecture In Class Group Questions</td>
<td>80</td>
</tr>
<tr>
<td>Lecture Mid-term</td>
<td>140</td>
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<tr>
<td>Lecture Final</td>
<td>140</td>
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<tr>
<td>Lab Total</td>
<td>400</td>
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<tr>
<td><strong>Course Total</strong></td>
<td><strong>800</strong></td>
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Grading Scale by percentage of 800 points

93 – 100 = A  
87 – 89 = B+  
80 – 82 = B-  
73 – 76 = C  
70 – 72 = C-  
67 – 69 = D+  
63 – 66 = D  
60 – 62 = D-  
≤ 59 = F

Book Chapter: In groups of two or three you will provide a summary of a chapter in Fishing Through the Apocalypse at the beginning of lecture. If you will be using PowerPoint, I need to receive a PowerPoint file no later than 8 PM the day before you will be presenting. The summary should be put into a broader context of topics from class. I’ll be giving an example presentation on the first chapter.

In Class Group Questions: There will be two group learning exercises during the term worth 40 points each; date below. If you are absent this day you will need a valid excuse to complete a make-up assignment. Everyone in the group receives the same grade. This will be a discussion-based, problem solving exercise and will be very similar to an exam question.

Tests: There is a mid-term and final exam in the lecture. I will provide study guides/lists of keywords and ideas you should know for each exam. Quizzes will be during lecture and the final at the appointed day/time.
The instructor reserves the right to revise, alter or amend this syllabus as necessary. Students will be notified in writing/email of any such changes.

Schedule (subject to change): 29 August – last day to drop without W, 14 November – last day to drop with W. Readings from the textbook are listed next to the lecture topic, and you should read this before lecture. There may also be readings, videos, or podcasts assigned; these will be mentioned in a preceding lecture or announced on Canvas.

Schedule (subject to change):

**Week 1: 23 August**
Lecture 1: Introduction and Class Goals

**Week 2: 28 and 30 August**
Lecture 2: Collection and curation of fishes/global diversity/nomenclature
Lecture 3: Morphology and Ecology 1

**Week 3: 4 and 6 September**
**Labor Day**
Lecture 4: Morphology and Ecology 2

**Week 4: 11 and 13 September**
Lecture 5: Genetics revolution and phylogenetics of fishes
Lecture 6: Agnathans to Gnathostomes

**Week 5: 18 and 20 September**
Lecture 7: Feeding
Lecture 8: Chondrichthyes 1

**Week 6: 25 and 27 September**
Lecture 9: Chondrichthyes 2
Lecture 10: Respiration

**Week 7: 2 and 4 October**
Lecture 11: Sarcopterygii and Tetrapod Evolution
Lecture 12: Polypteridae to Holostei

**Week 8: 9 and 11 October**
Lecture 13: Intro to Teleostei & Elopomorpha
Lecture 14: Osteoglossiformes and Otocephala

**Week 9: 16 and 18 October**
Lecture 15: Gonorynchiformes and Life History/Developmental Strategies
Lecture 16: Cypriniformes

**Week 10: 23 and 25 October**
**Mid-Term**
Lecture 17: Gymnotiformes and Speciation

**Week 11: 30 October and 1 November**
Lecture 18: Biogeography and Hybridization
Lecture 19: **Group Activity 1**
**Week 12: 6 and 8 November**
Lecture 20: Characiformes and Siluriformes
Lecture 21: Euteleostei

**Week 13: 13 and 15 November**
Lecture 22: Acanthomorpha
Lecture 23: Acanthopterygii 1 and Phenotypic Novelty

**Week 14: 20 and 22 November**
Lecture 24: Diversity of Southeastern Fishes Reflection (out of class)

Thanksgiving

**Week 15: 27 and 29 November**
Lecture 25: Group Activity 2
Lecture 26: Acanthopterygii 2

**Week 16: 4 and 6 December**
Lecture 27: Acanthopterygii 3
Lecture 28: Acanthopterygii 4 and Rare Fishes

**Final Exam:**
Tuesday, 12th Dec., 10:30 AM to 12:30 PM, normal classroom

**The Campus Syllabus:**

Dear Student,

The purpose of this Campus Syllabus is to provide you with important information that applies to all UTK courses. Please observe the following policies and familiarize yourself with the university resources listed below. At UT, we are committed to providing you with a high-quality learning experience. I want to wish you the best for a successful and productive semester.

–Dr. John Zomchick, Provost and Senior Vice Chancellor

**ACADEMIC INTEGRITY**

Each student is responsible for their personal integrity in academic life and for adhering to UT’s Honor Statement. The Honor Statement reads: “An essential feature of the University of Tennessee, Knoxville is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the university, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity.”

**YOUR ROLE IN IMPROVING THE COURSE THROUGH ASSESSMENT**

At UT, it is our collective responsibility to improve the state of teaching and learning. During the semester you may be requested to assess aspects of this course, either during class or at the completion of the class, and through the TNVoice course evaluation. Please take the few moments needed to respond to these requests as they are used by instructors, department heads, deans and others to improve the quality of your UT learning experience.

*The instructor reserves the right to revise, alter or amend this syllabus as necessary. Students will be notified in writing / email of any such changes.*
STUDENTS WITH DISABILITIES – http://sds.utk.edu
The University of Tennessee, Knoxville, is committed to providing an inclusive learning environment for all students. If you anticipate or experience a barrier in this course due to a chronic health condition, a learning, hearing, neurological, mental health, vision, physical, or other kind of disability, or a temporary injury, you are encouraged to contact Student Disability Services (SDS) at 865-974-6087 or sds@utk.edu. An SDS Coordinator will meet with you to develop a plan to ensure you have equitable access to this course. If you are already registered with SDS, please contact your instructor to discuss implementing accommodations included in your course access letter.

ACCESSIBILITY POLICY AND TRAINING – http://accessibility.utk.edu
The University of Tennessee, Knoxville, provides reasonable accommodations for individual students with disabilities through its office of Student Disability Services. The university is also committed to making information and materials accessible, when possible. Resources and assistance to support these efforts can be found at http://accessibility.utk.edu/.

WELLNESS – http://wellness.utk.edu/ and http://counselingcenter.utk.edu/
The Center for Health Education and Wellness empowers all Volunteers to thrive by cultivating personal and community well-being. The Center can answer questions about general wellness, substance use, sexual health, healthy relationships, and sexual assault prevention. The Student Counseling Center is the university’s primary facility for personal counseling, psychotherapy, and psychological outreach and consultation services.

Any student who has difficulty affording hygiene products, groceries, or accessing sufficient food to eat every day is urged to contact the Big Orange Pantry for support. The Big Orange Pantry, located in Greve Hall, is a free resource for all students, faculty, and staff, no matter how great or small their need is. Students who need emergency financial assistance can also request funding from the Student Emergency Fund.

Students who are experiencing non-academic difficulty or distress and need assistance should call 974-HELP or submit an online referral. The 974-HELP team specializes in aligning resources and support to students experiencing mental health distress.

EMERGENCY ALERT SYSTEM – http://safety.utk.edu/
The University of Tennessee, Knoxville, is committed to providing a safe environment for learning and working. When you are alerted to an emergency, please take appropriate action. Learn more about what to do in an emergency and sign up for UT Alerts. Check the emergency posters near exits and elevators for building specific information. In the event of an emergency, course schedules and assignments may be subject to change. If changes to graded activities are required, reasonable adjustments will be made, and you will be responsible for meeting revised deadlines.

COVID-19 GUIDELINES (updated January 21, 2022)
According to public health authorities, in areas where there is substantial or high COVID-19 transmission, wearing masks in indoor spaces can help reduce transmission of the virus and keep communities healthy. Any individual can choose to wear a mask anywhere on campus, even when it is not required. The university expects everyone to protect others from the spread of COVID-19 and strongly recommends wearing masks in academic and administrative spaces.

For the most current information on masks, please check the COVID-19 website at http://www.utk.edu/coronavirus.

The instructor reserves the right to revise, alter or amend this syllabus as necessary. Students will be notified in writing / email of any such changes.
The university recommends that all members of the campus community be vaccinated for their own protection, to prevent disruption to the semester, and to prevent the spread of COVID-19. The Student Health Center medical staff is available to students to answer questions or discuss concerns about vaccines, and the center provides vaccines free of charge for anyone 18 years or older who would like one. Vaccination information and appointment signups are available at http://tiny.utk.edu/vaccine.

If you think you are sick or have been exposed to COVID-19, you should contact the Student Health Center or your preferred health care provider. You can also contact the university’s COVID-19 support team for guidance by filling out the COVID-19 self-isolation form at http://covidform.utk.edu.

You are advised not to attend class in-person if you are sick or need to isolate or quarantine. The university has more detailed guidance on quarantine and isolation. The university recommends that students and employees stay home anytime they do not feel well.