Ecology of Fishes
Pymatuning Laboratory of Ecology

Session 3, 2020
June 22-July 10

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About the course

In this course, taught at the Pymatuning Laboratory of Ecology in northwest Pennsylvania, students will explore the population, community, and ecosystem ecology of fishes. We will conduct field investigations in streams, lakes, and marshes. Students will attend background lectures, conduct experiments and field surveys, participate in data collection and analysis, and gain experience in the interpretation and presentation of results. We will learn how to integrate math, physics, chemistry, and biology in our study of fishes. In addition, we seek to expose students to current research in fish ecology. Students will participate in the design of experiments, data analysis, and hone their presentation skills. Most importantly, they will leave the course with a greater knowledge of and appreciation for Pennsylvania's rich diversity of fishes.

Fisheries resources have a large social and economic value and we will also consider important issues related to managing fisheries in a sustainable manner. Because fisheries managers work on issues of large social interest, they must bring together an understanding of cultural values, historical context, political processes, and biological processes in order to be successful, and we will emphasize how scientific knowledge is integrated with social values in shaping fisheries management.

Specific Learning Outcomes

1) Using fish and their environment as a model system, students will investigate the ecology of fishes of northwest Pennsylvania, and in doing so will gain practical experience in executing the scientific method.
2) Students will apply skills such as mathematics, computing, quantitative reasoning, and writing to addressing questions in fish ecology.
3) Students will achieve a greater understanding of applied issues involved in management of fisheries resources, including cultural values, historical context, political processes, and biological processes.

Competence in these three areas will be assessed via quizzes, tests, and focused homework assignments, as well as performance in the field.

Schedule 2020

Mon. 6/22 The Physical Stage: Limnology and Stream Ecology
Lab: Invertebrate Sampling, Local Ponds and Lakes

Tues. 6/23 The Physical Stage: Limnology and Stream Ecology
Lab: Methods in Limnology, Vertical Profiles

Wed. 6/24 Historical Factors in Fish Diversity: Taxonomy
Lab: Measuring Species Richness, Pymatuning Reservoir

Thur. 6/25 The Ice Ages! Biogeography of Fish
Lab: Fish Diversity of Sugar Lake

Fri. 6/26 Functional Morphology and Food Habits
Lab: Morphology and Diet Analyses, Pymatuning Reservoir

Mon. 6/29 Habitat selection in fishes
Lab: trapping study, Linesville Creek

Tues. 6/30 **Test 1: 9:00 AM**
Competition and Predation in Fish Communities
Lab: Fish Survey, Linesville Creek

Wed. 7/1 Ecology of Large Rivers
Lab: Shenango River

Thur. 7/2 Fish Propagation
Lab: Visit Tionesta Hatchery, Meet PFBC Biologists, All-day canoe trip, Allegheny River

Fri. 7/3 **No Classes!**

Mon. 7/6 Behavioral Cascades and Indirect Effects in Fish Communities
Lab: Fish Surveys, Payden Creek

Tues. 7/7 Productivity/Diversity Relationships in Fish Communities
Lab: All Day Field Trip, French Creek

Wed. 7/8 Humans and Fish: Case Studies of Lake Victoria and Lake Erie
Lab: All Day Field Trip, Presque Isle

Thur. 7/9 Invasive species and other current challenges in fisheries management
Lab: Visit with PA Fish and Boat Fisheries Biologists. Afternoon: Independent Projects

Fri. 7/10 **Test II: 9:00 AM**
Presentation of Class Projects: 1:00 PM

Additional Information

Text: "Fishes of the Allegheny: Species accounts and natural history notes" 2016; Andrew M. Turner.

Daily Schedule: In general, we will begin lecture each day in the fish lab at 8:30 AM, and we will try to conclude the day's activities at 5:00 PM. The van will leave the dining hall for the lab site at 8:15 AM sharp. We may deviate from this schedule from time to time.

How to Dress: Fish live in water, and sometimes in murky, muddy water, so we too will spend most of this course in the water, and sometimes in murky, muddy water. You will want to wear waders when you are electrofishing (the waders provide your only insulation from the electric current). You may borrow hip boots from PLE, or you may elect to purchase your own. I suggest wearing jeans and socks with your waders in order to avoid falling victim to the dreaded "wader rash". It is generally most comfortable to wear shorts and old but sturdy shoes when performing field activities other than electroshocking. Finally, if you own a mask, snorkel, and fins, you may want to bring them along for the Presque Isle and Allegheny field trips.

Safety: Nothing in more important than your personal safety. If you are uncomfortable with the water, wear a life jacket. Use caution and common sense when using the boats, electrofishing gear, etc.

Grades: You are responsible for all material covered in lecture, laboratories, and in the field. You should know the common name and family of all fish we encounter. Final scores will be calculated as follows:
Test I: 25%
Test II: 25%
Quizzes 30%
Final Project 10%
Contribution to Class: 10%
Grades will be assigned as 90-100 = A, 80-89 = B, etc.

Independent Project: a portion or your grade will be based on your independent project. Here you are required to conduct research aimed at answering an original question. You will present a 10-20 minute long lecture on your project the final day of the course. The ideal project will use data collected by the entire class but synthesized by yourself.

Class Projects: We will run the laboratory portion of the class as a series of class projects. The class will be divided into three groups, and each day one of the three groups will be responsible for recording and synthesizing all the data collected that day. We will then start the next day with a brief (15 minute?) presentation of the previous day's project by the responsible group. Each presentation should be accompanied by a short handout summarizing the data collected the previous day. A note about writing things down and keeping them organized: because data collected early in the course may be used later in the course for independent projects, it is important that we carefully record and organize the all data from our field trips. Indeed, a critical step in becoming a scientist is merely learning to write things down so that others can make use of your observations.

Academic Honesty: Cheating/plagiarism will not be tolerated. Students enrolled in courses at PLE are expected to abide by the academic integrity policies of both the University of Pittsburgh and, where applicable, the other institution through which they enrolled. Students suspected of violating either or both institutions' policies will be required to participate in the procedural process outlined therein. A minimum sanction of a zero score for the quiz or exam will be imposed.

Academic integrity policies can be found at the links below:
University of Pittsburgh: www.cfo.pitt.edu/policies/policy/02/02-03-02.html
Clarion: http://www.clarion.edu/student-life/student-affairs/conduct-policies-and-judicial-services/student-code-of-conduct/academic-integrity-policy.html
Chatham: https://www.chatham.edu/academics/catalog/2017-2018/HonorCode/
Edinboro: http://www.edinboro.edu/directory/offices-services/social-equity/common-course-policies.html
IUP: https://www.iup.edu/graduatestudies/catalog/university-policies/academic-policies/academic-integrity-policy-and-procedures/
Slippery Rock: http://catalog.sru.edu/content.php?catoid=22&navoid=437#acad_inte

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the PLE Program Administrator, 814-273-0416 as early as possible to determine reasonable accommodations for this course.

Attitude: Fish are a source of endless fascination, and there is much yet to be learned about them. I expect the students in this course to approach the material with enthusiasm, and I trust that students that do so will perform well in this course. Help your classmates with the fieldwork, and help organize the data. This should be a fun course.