

Biology 3632 - Applied Field Methods in Fish Ecology
Dalhousie University, Summer

Instructor:

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TA: TBD

Prerequisites:

PREREQUISITE: BIOL 2060.03 and (STAT 1060.03 or MATH 1060.03 or DISP) or their equivalents or permission of instructor
CROSS-LISTING: MARI 3632.03, ENVS 3632.03

Classroom:

Our classroom is LSC (TBD). We will meet there unless otherwise noted, and any schedule changes will be posted on the door. Computers in the (TBD) lab are available for your use. If you want to use the room outside of normal office hours you can get a code to the computer lab door from the Biology main office. Tell them you are taking this class and show your ID. All field trips leave from the parking area outside the Biology office, between the LSC and Kings.

Meeting Times:

Field days start early – consult the schedule. In class days start at 9:00 AM. We will try to finish in class days by 4:25, but field days may be longer because of driving times. There is no class on Sundays. The last day of class is scheduled for you to work on your research proposals. Please note that the schedule is dependent on weather and guest lecturers and will likely require some modification. You will be required to do assignments on your own time. Please refrain from making any other commitments for the duration of the class.

Purpose and Scope:

This class is designed to teach students how to conduct field research on fishes. It is field intensive, hands-on, and applied. The major focus will be on practical techniques and tradeoffs between data quality, quantity, costs, and ethical/environmental considerations. Fieldwork will concentrate on day trips to lakes, streams, salt marshes and shallow water marine habitats. Topics will include techniques for sampling fish, designing and conducting surveys, measuring phenotypic variability, quantifying temporal and spatial variation in populations, and will include statistical analysis, display and interpretation of data collected. Lectures and laboratories will complement fieldwork. You will gain experience in critical thinking and field techniques, and will not be required memorize a lot of terminology or names.

Field Trips:

This class is field intensive. You are expected to arrive on time prepared for the field trips as scheduled. The vans will not wait for you. Be prepared for all types of conditions.

Required Reading:

There is no reading required before the start of the class. A small amount of material will be handed out during class.

Student Responsibilities:

Attendance is mandatory. You are expected to attend all lectures, labs, and field trips. Any unnecessary absences will be deducted from your final mark – 5% per half day. If a problem develops that may keep you from attending a class, contact me at once.

Participation. You are expected to participate and cooperate in all class activities. If you cause a problem, your final grade will be deducted in proportion to the severity of the problem. Please note that alcoholic beverages are NOT permitted on the field trips (university regulations).

Schedule changes. You are responsible for finding out about schedule changes and contacting us if you have any questions about the class meeting times, field trips, or material. If a field trip becomes postponed due to weather, an email will be sent.

Preparation for field trips. You are expected to come prepared for field trips. You will need to bring appropriate clothing and footwear for each trip and any personal items needed (see list). Sorry but university regulations prevent us from allowing you to use your own transportation to field sites.

Email address: Schedule changes and data file sharing will be done by email and thus you will need a working email address.

Evaluation of Student Performance:

Assignment or Presentation	Team or Indiv.	Marks (out of 100)
Group presentation (research proposal)	Group (2)	30
Visual census experiment	Individual	15
Electrofishing experiment	Individual	15
Minnow trap experiment	Individual	15
Stock assessment entry	Group (2)	10
Final exam	Individual	15

Grading scheme: 90.0-100 (A+), 85.0-89.9 (A), 80.0-84.9 (A-), 75.0-79.9 (B+), 70.0-74.9 (B), 65.0-69.9 (B-), 62.0-64.9 (C+), 58.0-61.9 (C), 55.0-57.9 (C-), 50.0-54.9 (D), <50.0 (F)

Research proposal

Students will do a research proposal to investigate real-life problems affecting fish populations. A list of about 20 problems will be given to choose from on the first day of class. Proposals will be done in groups of two. Proposals will be presented to the class on Monday June 10 and an annotated bibliography to accompany the proposal is due at 9:00 AM Monday June 10. Proposals should include: background, methods (survey design, measurements collected, potential caveats, ethics and permits needed), hypothesis or expected results, how you would display the results, and significance.

Experiments

For each of the three experiments (Visual census, Electrofishing, Minnow traps) include: 1) brief background including 3 references from the literature, 2) detailed description of methods used, 3) results with at least one figure and caption, 4) major findings, 5) important caveats, and 6) broad importance of the experiment. With the exception of the figures and captions, each experiment should be less than one single spaced page. The object is to be informative and precise, but also concise.

Data files

From data gathered in the field, students will produce data files that will be shared with the other students in the class for the experiment analyses. We will use Microsoft Excel for this work. A working email address is required for each student to share these data files.

Exam

An exam will be given on the final day of class following the presentations. It will focus on the material covered in class and will evaluate your ability to think critically and be creative about aspects related to field biology.

Stock assessments

Stock assessments, which include biological and fisheries data, provide fisheries managers with the information that is needed for a fish stock to be managed. In pairs, you will select a fish population from a list and enter the information in a stock assessment format from the literature.

What you should bring on the daytime field trip:

- RUBBER BOOTS!!!
- raingear (**at least a jacket; pants also a good idea**)
- field notebook
- clipboard
- handouts if appropriate
- pencils
- plastic bag to keep things dry
- hiking boots or sneakers (so you don't have to wear your rubber boots or wet shoes all day!)
- warm clothing
- windproof jacket

- lunch, snacks, **water**
- sunscreen
- hat & gloves (if raining, your hands can get very cold!)
- Digital camera (optional yet, very recommended)
- flashlight

Tentative schedule BIOL 3632– Dates and Activities may change due to weather and Guest Lecturer availability.

Morning	Afternoon
Welcome Intro Fish Ecology Relevance of fish sampling Select group project	Survey design Data Ethics & logistics Introduce course experiments
Population dynamics (Dave Keith) Tracking (Ian Jonsen) Statistics in Ecology (Greg Britten)	Ecosystem modeling (Tyler Eddy) Consultancy (Emilie Reuchlin-Hughenoltz) Make minnow traps
Field: Visual census field sampling (Sackville) – vans leave at 8:00 am.	Field: Visual census field sampling Compile visual census data
Population trend workshop. Visual census analysis & write-up.	Stock assessments lecture Select species for stock assessment
Visual census experiment due Aquaculture lecture Electrofishing lecture	Sustainable Blue - closed-containment aquaculture tour
Field: Electrofishing in Sheet Harbour with Eddie Halfyard. Vans leave at 7:00 am.	Field: Electrofishing (this will be a late day)
SUNDAY OFF	SUNDAY OFF
Electrofishing experiment due Field: Minnow trap experiment in Lawerencetown salt marshes. Vans leave at 8:00 am	Field: Lawerencetown
Statistics workshop for minnow trap data: Mark-recapture, population trends, morphometrics	Compile data and write-up sticklebacks (mark-recapture, morphometrics, population trends)
Field: Beach seining with Clean NS in restoration watershed (Location TBD). Vans leave at 9:00 am.	Field: Beach seining
Field: Beach seining with Clean NS in restoration watershed (Location TBD). Vans leave at 9:00 am.	Field: Beach seining
Minnow trap experiment due Age and growth Lab: fish scales (Steve Campana)	Age and growth Lab: fish scales Work on stock assessments
Prepare group presentation Stock assessment due	Prepare group presentation
SUNDAY OFF	SUNDAY OFF
Presentations	Presentations Final Exam 15:00