

Syllabus

Ecology & Evolution of Fishes

Department of Biology

BIOL/MARI 3080, FALL 2025

Dalhousie University acknowledges that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People and pays respect to the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights. We are all Treaty people.

Dalhousie University also acknowledges the histories, contributions, and legacies of African Nova Scotians, who have been here for over 400 years.

Course Instructor

Name	Email	Office Hours
Professor Glenn Crossin www.evophys.ca	Glenn.Crossin@dal.ca	By appointment – email me. LSC 6060

Course Description

The course examines selected topics on the ecology and evolution of marine and freshwater fishes. These include: phylogeny and systematics, functional morphology and physiology, life-history evolution, behavior, reproduction, and conservation.

Course Prerequisites

- A grade of B- (2.7) is required in each of the following prerequisite classes: BIOL 2003, BIOL 2040, and BIOL 2060.

Course Structure

Course Delivery: In the classroom: live and in person only.

Lectures: MWF 1212-1335 | LSC C240

Laboratories: This course once had a laboratory section, but it has been moved from BIOL/MARI 3080 and renamed BIOL/MARI 4080. This is a separate and optional 4th year course.

Course Materials

There is no required textbook for the course. But... Nelson, Grande and Wilson's "Fishes of the World" 5th edition (Wiley) is a key source of information and worth having in your own library. The university library also has copies to borrow. A link to a digital version can be found on the course Brightspace page.

Assessment

Exam 1	40%
Exam 2	35
Exam 3	25
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	= 100%

All exams are written exams, wherein you will respond to short and long-answer questions. Responses must be legible. In addition to the content of your answers, grammar and syntax are also important, so points will be deducted if your meaning isn't clear.

A visual Fish ID test usually occurs at the end of term, but this year it has been removed due to the administrative lockout that shortened our semester.

Course grading scheme

Conversion of numerical grades to final letter grades follows the [Dalhousie Grade Scale](#)

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (0-49)
A- (80-84)	B- (70-72)	C- (55-59)	

Course Policies on Missed or Late Academic Requirements

Lectures are in person only, and are not recorded or broadcast synchronously. Students should attend class – all material for the exams comes directly from the class lectures. The copies of lecture material that I post to the Brightspace page do not contain all the details that I discuss in class, so you will not do well if you rely only on the slides without having attended the lectures. Come to class and take notes. If you miss a class, get notes from your peers.

Without prior notification, a missed exam will involve a 5 percentage point reduction to that exam's grade (e.g. 100% changes to 95%, while 85% changes to 80%, etc). You MUST Inform me by the night before an exam if you are going to miss it, and at that time you must also submit a Self Declaration of Absence (SDA) form. **ONLY one SDA is permitted during the term.** All

make-up exam must be written within 2-3 days of the originally scheduled exam date. For example, if the exam was on a Monday, you must then rewrite it by Thursday; if the exam was on a Friday you must rewrite on Monday; but if the exam was on a Wednesday, then you must write it within 2 days, by Friday. Makeup exams will not be offered after these timeframes. Note that I am not obligated to provide you with a makeup exam, so excuses other than illness or extreme circumstance are unlikely to be considered. If an exam is missed without a makeup, the weight of that missed exam will not be redistributed across other exams.

**** Note:** makeup exams are completely new exams – they will not be the same exam that your peers wrote in the classroom. It will ask different things and cover different topics, but all from the material expected for the exam as detailed in the syllabus. It behooves you to take the in-class exam.

Learning objectives

- Describe the phylogenetic characteristics of, and relationships amongst all, extinct and extant fish lineages.
- Understand the evolutionary origins of the Vertebrata, within the Phylum Chordata.
- Describe external and internal morphological features of fish, making appropriate use of relevant terminology.
- Describe the basics of fish physiology, reproduction, and life-history.
- Describe the various forms of fish movement, and how buoyancy affects fish locomotion.
- Describe how fish make use of sound and/or electricity to sense their surroundings.
- Describe how a fish respire.
- Describe the feeding morphology and trophic polymorphisms of various fish groups.
- Describe the reproductive morphology, costs, and strategies of various fish groups.
- Describe life history theory and explain how it relates to the evolution of age and size at maturity, and the evolution of reproductive effort.
- Ability to identify major fish groups visually, via knowledge of key traits and characteristics.

Course Content and Class Schedule

The content of this course and the schedule of lectures are captured below. Note however that the schedule is tentative, and subject to change. If a change should occur (e.g. due to a hurricane, etc), you will be informed in class.

Note: Due to the administrative lockout, we have lost nine lecture days, so the content of this course is not as extensive as it has been in the past. Nevertheless, after juggling the schedule, I have managed to keep the core material intact, and so you will definitely get a an excellent foundation in fish ecology and evolution, despite the lockout.

Tentative Class schedule ...

Week of	Day	Lecture #	Topic
Sep 3 – 5	Wed	-	Dalhousie Administrative Lock-Out of the Faculty
	Fri	-	
Sep 8 – 12	Mon	-	v
	Wed	-	v
	Fri	-	v
Sep 15 – 19	Mon	-	v
	Wed	-	v
	Fri	-	v
Sep 22 – 26	Mon	-	v
	Wed	-	COURSE INTRODUCTION
	Fri	1	Intro to Diversity of Fishes
Sep 29 – Oct 3	Mon	2	Early Phylogeny of Fishes
	Wed	3	Cladograms, Phylogenies & the Agnathans
	Fri	4	Agnathans to Placoderms
Oct 6 – 10	Mon	5	Placoderms and Chondrichthes
	Wed	6	Chondrichthyes to Dipnoi
	Fri	7	Rhizodontimorpha to Chondrostei
Oct 13 – 17	Mon	-	No Classes – Thanksgiving
	Wed	-	> Research Lecture 1 – Biology of Sturgeon
	Fri	8	Neopterygii to Osteoglossomorpha
Oct 20 – 24	Mon	9	Otocephala
	Wed	-	Recitation
	Fri	-	EXAM 1 – Lectures 1-9 (40%)
Oct 27 – Oct 31	Mon	10	Protacanthopterygii to Paracanthopterygii
	Wed	11	Acanthopterygii - Beryciformes to Cyprinodontiformes
	Fri	12	Acanthopterygii - Swamp Eels to Centrarchid Sunfishes
Nov 3 – 7	Mon	13	Acanthopterygii - Archerfishes to Tetraodontiformes
	Wed	14	Movement & Locomotion
	Fri	15	Bouyancy
Nov 10 – 14	Mon	-	Reading Week
	Wed	-	
	Fri	-	
Nov 17 – 21	Mon	16	Hearing and Sound production
	Wed	-	Recitation
	Fri	-	EXAM 2 – Lectures 10-16 (35%)
Nov 24 – 28	Mon	17	Lateral line and electricity
	Wed	18	Feeding and trophic polymorphisms
	Fri	19	Reproductive anatomy
Dec 1 – 5	Mon	-	> Research Lecture 2 – Pacific salmonids
	Wed	20	Reproductive strategies
	Fri	-	> Research Lecture 3 – Hatchery effects on fitness
Dec 8 – 10	Mon	-	Recitation
	Wed	-	EXAM 3 – Lectures 17-20 (25%)

University Policies and Statements

Recognition of Mi'kmaq Territory

The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit or e-mail the Indigenous Student Centre at 1321 Edward St or elders@dal.ca. Additional information regarding the Indigenous Student Centre can be found at: https://www.dal.ca/campus_life/communities/indigenous.html

Academic Integrity

Dalhousie University expects all of its students to espouse the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, you are required to demonstrate these values in all of your academic dealings. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact the Student Accessibility Centre: https://www.dal.ca/campus_life/academic-support/accessibility.html

Conduct in the Classroom – Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires your willingness to hear and tolerate opposing points of view. Respect for individual differences and alternative viewpoints is expected for all class members. The language used to express and respond to different points of view must remain within acceptable bounds of civility and respect; denigration and disparity will not be tolerated.

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. Dalhousie's Strategic Direction prioritizes the fostering of diversity and inclusiveness (Strategic Priority 5.2). Additional diversity and inclusion information can be found at: <http://www.dal.ca/cultureofrespect.html>

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. Dalhousie has the right to take disciplinary action if students breach the Student Code of Conduct. Violations of the code can be resolved in a reasonable and informal manner, e.g. through a restorative justice

process. If an informal resolution can't be achieved, then a formal dispute resolution process would be initiated. The full Code of Student Conduct can be found at:

https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Student Use of Course Materials

Course materials are designed for use as part of this course at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading to a commercial third-party website) may lead to a violation of Copyright law.