

Ecology & Evolution of Fishes

Syllabus

Department of Biology
BIOL/MARI 3080, FALL 2024

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(s)

Name	Email	Office Hours
Professor Glenn Crossin	gtc@dal.ca	By appointment – email me.

Course Description

The course examines selected topics on the ecology and evolution of marine and freshwater fishes. Topics 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 for each of the following prerequisite classes: BIOL 2003, 2040 and 2060.

Course Structure

Course Delivery

- In the classroom: live and in person only.

Lectures

- LSC 238 | Mon, Wed, Fri | 08:35-09:25 AST.

Laboratories

- The labs have been moved to a separate, optional 4th year course – BIOL/MARI 4080.

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, both physical and digital.

Assessment

Exams

Exam 1 (early February)	40%
Exam 2 (early March)	35
Exam 3 (late March)	15
<u>Fish ID test (late March, End of term)</u>	<u>10</u>
	= 100%

All exams are written exams. You will respond to short and long-answer questions. Responses must be legible. Grammar and syntax are important... points will be deducted if your meaning isn't clear.

A Fish ID test will occur at the end of term. At the beginning of term, you will be presented with a slide-deck containing 50 fish species, with their common and family names presented. You will have all term to memorize these. At the Fish ID test, you will then be presented with a subset of these fishes, and you will have to answer a question specific to the species or family that it comes from. All the information that you need to excel on this Test will be presented in the lectures.

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, they are not recorded or broadcast synchronously. Students should attend class – all material for the exams comes directly from the class lectures. The copies of

powerpoint files 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.

Concerning missed exams: I will only permit a makeup exam if I feel you have a reasonable, legitimate excuse such as a major illness or death in the family. You must contact me before the exam if you are going to miss it. If you do not notify me in advance, then you are not guaranteed a makeup exam ... these are offered at my discretion. If you contact me before the exam and have what I deem to be a legitimate excuse, then I will offer you a makeup exam. All Makeup exams must be written within 4 weekdays of the originally scheduled exam. So if the exam was on a Monday, then a makeup exam would occur sometime between Monday and Friday. Or if the exam was on a Wednesday, then the makeup would up to the following Tuesday.

If you are going to miss an exam, then an SDA must be submitted prior to the exam. Only 1 SDA is permitted per term.

****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.

Course Policies related to Academic Integrity

Because assessment is entirely exam and test based, there is no collaborative work in this course, nor is there any written work outside of the classroom.

Learning Objectives

- Describe the phylogenetic characteristics of and relationships amongst all extinct and extant fish lineages.
- Describe the basics of fish swimming mechanics, physiology, behaviour, and life-history.
- Ability to look at an unknown fish species, and based on knowledge of its morphology alone, place it within the phylogeny presented in class.
- Ability to identify major fish groups visually, via knowledge of key traits and characteristics.

Course Content

The content of this course is captured in the tentative class schedule outlined below...

Week of	Day	Lecture #	Topic
Sep 2 – 6	Mon	-	COURSE INTRODUCTION
	Wed	1	Intro to Diversity of Fishes
	Fri	2	Early Phylogeny of Fishes
Sep 9 – 13	Mon	3	Cladograms, Phylogenies & the Agnathans
	Wed	4	Agnathans to Placoderms
	Fri	5	Placoderms and Chondrichthyan synapomorphies
Sep 16 – 20	Mon	6	Chondrichthyes to Dipnoi
	Wed	7	Rhizodontimorpha to Chondrostei
	Fri	8	Special Lecture – Biology of Sturgeon
Sep 23 – 27	Mon	9	Neopterygii to Osteoglossomorpha
	Wed	10	Otocephala
	Fri	11	Protacanthopterygii to Paracanthopterygii
Sep 30 – Oct 4	Mon	-	No Classes – Truth & Reconciliation Day
	Wed	-	Recitation
	Fri	-	EXAM 1 – Lectures 3-11 (40%)
Oct 7 – 11	Mon	12	Acanthopterygii - Beryciformes to Cyprinodontiformes
	Wed	13	Acanthopterygii - Swamp Eels to Centrarchid Sunfishes
	Fri	14	Acanthopterygii - Archerfishes to Tetraodontiformes
Oct 14 – 18	Mon	-	No Classes - Thanksgiving
	Wed	15	Movement & Locomotion
	Fri	16	Bouyancy
Oct 21 – 25	Mon	17	Hearing and Sound production
	Wed	18	Lateral line and electricity
	Fri	-	Recitation
Oct 28 – Nov 1	Mon	-	EXAM 2 – Lectures (35%)
	Wed	19	Hearing and Sound production
	Fri	20	Special Lecture – Pacific salmonids
Nov 4 – 8	Mon	21	Feeding and trophic polymorphisms
	Wed	22	Reproductive anatomy
	Fri	23	Reproductive strategies
Nov 11 – 15	Mon	-	-
	Wed	-	READING WEEK
	Fri	-	-
Nov 18 – 22	Mon	24	Sleep in Fishes
	Wed	-	EXAM 3 (15%)
	Fri	25	Life history evolution
Nov 25 – 29	Mon	26	Special Lecture: Movement ecology of coral reef fishes
	Wed	-	FISH ID prep day (no class)
	Fri	-	FISH ID TEST and Quiz (10%)
Dec 2,3,4	M,T,W	-	FISH ID RESULTS, Special Lectures – tbd.

University Policies and Statements

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional 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

Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." Additional internationalization information can be found at: <https://www.dal.ca/about-dal/internationalization.html>

Academic Integrity

At Dalhousie University, we are guided in all our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, you are required to demonstrate these values in all the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. Additional academic integrity information can be found at: 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) for all courses offered by Dalhousie with the exception of Truro. For courses offered by the Faculty of Agriculture, please contact the Student Success Centre in Truro (<https://www.dal.ca/about-dal/agricultural-campus/student-success-centre.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 willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

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. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture 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. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner - perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. 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

Fair Dealing Policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. Additional information regarding the Fair Dealing Policy can be found at: https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html

Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. Additional information regarding Originality Checking Software can be found at:

https://www.dal.ca/dept/university_secretariat/policies/academic/student-submission-of-assignments-and-use-of-originality-checking-software-policy-.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.