



ZOO*4330 Biology of Fishes

Winter 2023

Section(s): 01

Department of Integrative Biology

Credit Weight: 0.50

Version 1.00 - January 06, 2023

1 Course Details

1.1 Calendar Description

This course provides a comparative examination of selected freshwater and marine fishes to illustrate the influence of aquatic environments on life styles, behavioral patterns, physiological responses, population biology and community structure. The use of niche, habitat and ecotope concepts in defining the role of fishes in representative types of aquatic ecosystems will be examined.

Pre-Requisites: 15.00 credits including (STAT*2040 or STAT*2230), ZOO*2090

1.2 Course Description

This course will be face-to-face during Winter 2023. Students are expected to be present on campus to participate in face-to-face lectures and laboratory exercises.

This course explores the diversity of freshwater and marine fish taxa and is organized around a variety of evolutionary, physiological, and ecological concepts that will aim to describe the biology of fishes in depth. You will learn about relations between species diversity and habitat, and investigate, through guided study, the extent of anatomical, skeletal, reproductive and morphological variation and its functional and evolutionary causes. This course also provides a practical experience in the study of fishes. Using University collections of preserved specimens, student collected samples (of fish and/or water), you will develop and apply skills in identification, sampling, DNA barcoding techniques. You will also have the opportunity to develop skills in the critical reading of primary literature, methods of scientific inquiry, scientific writing, and oral presentations.

1.3 Timetable

Please note that labs and lectures for this class will be face-to-face in Winter 2023.

Lectures: Monday and Wednesday 12:30-1:20 pm in room MCKN 121

Labs: Section 101 - Tuesday 2:30-5:20 pm in room SSC 2303

Section 102 - Wednesday 2:30-5:20 pm in room SSC 2303

Section 103 - Thursday 2:30-5:20 pm in room SSC 2303

1.4 Final Exam

Date: April 22 at 8:30 am

Location: TBA. Please see WebAdvisor for the latest information.

2 Instructional Support

2.1 Instructional Support Team

Instructor: Nick Bernier
Email: nbernier@uoguelph.ca
Telephone: 519-824-4120 x56093
Office: SSC 3467
Office Hours: I am available by email and by appointment. Please allow up to 24 h for a response during business hours.

Email policy: I will respond to your emails as quickly as I am able within working hours (weekdays 8:30-4:30 PM). You are welcome to email me at any time, but please be aware that if you email me in the evening or on weekends, I might be unable to respond until working hours.

Lab Co-ordinator: Timothy Bartley
Email: tbartley@uoguelph.ca
Telephone: (519) 824-4120 x53676
Office: SSC 2505
Office Hours: During your regularly scheduled lab time. Otherwise by appointment only. Requests should be made by email, and the Instructor will decide if a meeting is required. All meetings will be virtual unless otherwise specified. Responses to emails and/or CourseLink Discussion posts will come within 48 hours but only during regular business hours (Monday to Friday from 8:30 am to 4:30 pm).

2.2 Teaching Assistants

Teaching Assistant (GTA):	Ben Schultz
Email:	bschultz@uoguelph.ca
Office Hours:	During your regularly scheduled lab time.
Teaching Assistant (GTA):	Cassandra Kotsopoulos
Email:	ckotsopo@uoguelph.ca
Office Hours:	During your regularly scheduled lab time.

3 Learning Resources

3.1 Required Resources

Courselink (Website)

<https://courselink.uoguelph.ca>

This course will make use of the University of Guelph's course website on D2L (via CourseLink). Consequently, you are responsible to obtain all information posted on the CourseLink page for ZOO*4330. Please check it regularly.

Zoom (Software)

This course may use Zoom. Students may be required to register for a free basic Zoom account using their University of Guelph email address.

Other Lab Equipment (Equipment)

Students will be responsible for providing their own dissection instruments, rulers, pencils, and laboratory notebooks.

Articles and Reviews (Readings)

There is no required textbook for this course. Assigned papers and reviews available on Courselink will complement class lectures.

4 Learning Outcomes

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Have an increased understanding of the evolutionary origins of the major fish taxonomic Classes, with emphasis on the bony fishes.
2. Gain a greater understanding of the structural diversity of fishes and of their morphological adaptations for feeding and locomotion.
3. Gain an understanding of the various 'modes' of reproduction in fishes.
4. Have knowledge of how abiotic factors influence adaptive capabilities in fishes.
5. Have greater insight into how growth is regulated in fishes.

6. Gain a heightened understanding of the various sensory modalities in fishes and how these anatomical and physiological adaptations interact in the social development of fishes.
 7. Students will develop meristic and mensural skills used to study the various aspects of fish biology.
 8. Through laboratory studies, students will apply methods of sampling fish diversity, and will relate diversity to habitat variables.
 9. Laboratory studies will allow students to develop a thorough understanding of fish anatomy, to explore variation in morphology among different groups of fishes and to test hypotheses regarding their function and evolution.
 10. Taxonomy exercises will allow students to become proficient in the use of dichotomous keys to assign fishes to taxonomic categories and North American specimens to Order, Family, and Species.
 11. Using class and individual data sets, students will hone their analytical-statistical skills as well as their writing skills.
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5 Teaching and Learning Activities

5.1 Lecture

Topics:

The course is divided into twelve weeks, with two lectures and one lab period per week. Lecture and lab topics are listed in the Lecture-Lab Schedule below:

Week of	Lectures	Laboratories
Jan. 9	Introduction; Structural Diversity of Fishes	Lab 1: Structural Diversity I
Jan. 16	Functional Morphology of Locomotion and Feeding	Lab 2: Structural Diversity II
Jan. 23	Evolution & Diversity of Fish Groups	Lab 3: DNA Barcoding Part I
Jan. 30	Evolution & Diversity of Fish Groups	Lab 4: Parade of Orders
Feb. 6	Life History & Reproduction	Lab 5: Ontogeny & Reproduction
Feb. 13	Social Behaviour	Lab 6: Behaviour

Feb. 20	Winter break	Winter break
Feb. 27	Sensory Modalities; Midterm	Lab 7: Meristics & Morphometrics
Mar. 6	DNA Barcoding; Sensory Modalities	Lab 8: DNA Barcoding Part II
Mar. 13	Longevity & Aging; Growth Regulation	Lab 9: Fish Dissection and Internal Anatomy
Mar. 20	Abiotic Factors and the Biology of Fishes	Lab 10: Freshwater Fish Identification
Mar. 27	Climate Change and Fish Performance	Lab 11: Marine Fish Identification
April 3	Conservation Fish Physiology	Lab 12: Lab Review

5.2 Lab

Topics:

Students will be required to attend face-to-face labs in Winter 2023.

Laboratory instructions and assignments will be provided online through CourseLink. Students will be responsible for providing their own dissection instruments, rulers, pens/pencils, and laboratory notebooks. Laboratory exercises may include demonstrations of scientific techniques, handling/dissection of fish specimens, handling/observation of live fish/embryos, and other experimental or instructional activities. Details for laboratories are subject to change.

6 Assessments

Details of all assessments for this course are subject to change.

6.1 Assessment Details

Lab Reports/Written Assignments (40%)

Due: Throughout the semester, CourseLink Dropbox

Final Lab Evaluation (Take Home) (20%)

Due: Week 12, CourseLink Dropbox

Midterm (15%)

Date: Wed, Mar 1, In class

Course content: Lectures 1 to 12

Final Exam (25%)

Date: Sat, Apr 22, 8:30 AM, TBD

Course content: Lectures 1 to 23

7 Course Statements

7.1 Assignment of Grades

- Work in this course is evaluated according to the University of Guelph grading standards. For a definition of the numerical grades you receive please see Resolution 1 in the section on Grading Procedures under Grades in VIII: Undergraduate Degree Regulations and Procedures in the University of Guelph 2017-2018 Undergraduate Calendar.

See Resolution 1 under 'Grading Procedures' in the Undergraduate Calendar for a description of grading standards used at the University of Guelph:

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-grds-proc.shtml>

- Grading rubrics will be used to illustrate the specific grading criteria used to evaluate the lab reports. These are available on *CourseLink*.
- You may check your grades at any time during the semester through the Grades page on the course website.

7.2 Missed Synchronous Labs and Lectures

If you are absent from lectures or labs during the semester, you will be expected to make up the missed material on your own.

7.3 Academic Consideration

If you are unable to complete any lab assessments by the deadline for documented medical, psychological, or compassionate reasons, please contact the Course Instructor or Lab Coordinator in advance of the deadline to make arrangements for a short extension.

Requests to the Instructor for Academic Consideration for documented medical, psychological or compassionate reasons may be considered, but only if they are made **at least 24 hours before the submission deadline**.

7.4 24-Hour Extension Passes on Lab Assessments

Every student will be given one 24-hour Extension Pass which can be used for any lab assessment. To use an extension pass, you must email the lab instructor before your assignment deadline with the subject line "24-hour Extension Pass" and include the specific assessment you require an extension on in the body of the email. These passes remain separate from regular Academic Consideration on medical, psychological, compassionate grounds (see 2020-2021 Undergraduate Calendar and section 7.4 above).

7.5 Late Policy

Work that is handed in late will be penalized 10% for each 24 hour period that they are late. If you encounter technical problems when submitting your writing assignments, please email both the assignment to the Lab Instructor and CourseLink Support in advance of the deadline to avoid late penalties. All late Assignments must be submitted via CourseLink.

7.6 Grade Corrections and Regrade Requests

Students with concerns about how an assessment was graded can contact the Teaching Team for clarification. Any concerns about grades for any assessments in this course must be expressed by email within 10 days of the release of grades for that assessment. Beyond this period, grades for assessments will not be adjusted. Students that are requesting a grade change due to calculation errors on the part of the Teaching Team or an issue with CourseLink rubrics/grades are not subject to the regrade policy.

Reassessment (Regrade) Policy

Any requests for grade changes or reassessments (aka regrades) must be made by email to the Lab Instructor including all of the following information:

1. email subject line with the course code and assessment name
2. a list of specific concerns that explicitly describes each discrepancy
3. supporting references or quotations of both the student's work and the instructions/rubric (for assignments) or the course content (for exams, and
4. an explanation of how each discrepancy affects the grade for the assessment

Requests for a regrade without this information will not be considered. When regrading is deemed appropriate, it will be conducted by a Teaching Team member that did not provide the original grade and will include the entire assessment (no partial regrades will take place). A regrade may result in a grade increase, a grade decrease, or no change to the grade. Only one regrade will be permitted per assessment.

7.7 Academic Integrity

Although we do encourage you to share thoughts and ideas while studying for the course, all material submitted for grading must be your own work! The University takes a serious view of

academic misconduct, including plagiarism. The penalties for academic misconduct are severe and can lead to expulsion from the University and the revocation/rescinding of a degree. Electronically submitted student assignments are automatically compared to other electronic documents (including online and student papers) by Turnitin™ for degree of similarity.

7.8 Pedagogical Values

- This course aims to support the mission statement and the learning objectives set out by the University of Guelph in the Undergraduate Calendar. This means that this course will be research intensive and learner-centered. Ultimately we want students to be capable of self-assessment, critical inquiry, and active learning.

Read the University of Guelph 'Mission Statement' in the Undergraduate Calendar:

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c02/index.shtml>

Read the University of Guelph 'Learning Outcomes' in the Undergraduate

Calendar: <https://www.uoguelph.ca/registrar/calendars/undergraduate/2016-2017/outcomes/>

8 Department of Integrative Biology Statements

8.1 Academic Advisors

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

8.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist.
<http://www.learningcommons.uoguelph.ca/>
- Science Commons: Located in the library, the Science Commons provides support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

8.3 Wellness

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance.
<https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations.
<http://www.selfregulationskills.ca/>

8.4 Personal information

Personal information is collected under the authority of the University of Guelph Act (1964), and in accordance with Ontario's Freedom of Information and Protection of Privacy Act (FIPPA) <http://www.e-laws.gov.on.ca/index.html>. This information is used by University officials in order to carry out their authorized academic and administrative responsibilities and also to establish a relationship for alumni and development purposes.

For more information regarding the Collection, Use and Disclosure of Personal Information policies please see the Undergraduate Calendar.
(<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/intro/index.shtml>)

8.5 Course Offering Information Disclaimer

Please note that course delivery format (face-to-face vs online) is subject to change up to the first-class day depending on requirements placed on the University and its employees by public health bodies, and local, provincial and federal governments. Any changes to course format prior to the first class will be posted on WebAdvisor/Student Planning as they become available.

9 University Statements

9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

9.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

For Guelph students, information can be found on the SAS website
<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website
<https://www.ridgetownc.com/services/accessibilityservices.cfm>

9.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

9.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

9.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars
<https://www.uoguelph.ca/academics/calendars>

9.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

9.10 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).

9.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

- <https://news.uoguelph.ca/return-to-campusess/how-u-of-g-is-preparing-for-your-safe-return/>
- <https://news.uoguelph.ca/return-to-campusess/spaces/#ClassroomSpaces>

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.
