

## Department of Biology Course Outline

**SC/BIOL 4340 3.00 Fish Biology  
Winter 2022**

**Course Description**

A study of fish biology (ichthyology), including anatomy, systematics, physiology, behaviour and ecology of freshwater and marine fishes. Special emphasis is placed on the unique features of fishes and their functional adaptation to aquatic environments. Three lecture hours. One term. Three credits.

**Prerequisites**

SC/BIOL 2030 4.00. Note: Completion of 60 credits required.

**Course Instructors and Contact Information**

<b>Course Director:</b>	Dr. Scott P. Kelly Location: Off campus	Email: <a href="mailto:spk@yorku.ca">spk@yorku.ca</a>
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**Schedule/Course Format**

**Asynchronous Content:**

1. Lecture material will be recorded and posted on eClass in advance of synchronous meetings
2. See schedule below for topics to be covered during the course/each calendar week

**Synchronous Content:**

Tuesday 11:30 AM – 12:45 PM (March 1<sup>st</sup> then March 8<sup>th</sup> onwards)  
 Thursday 11:30 AM – 12:45 PM (for entire semester)

Purpose of synchronous meetings:

1. Discuss lecture material
2. Answer student questions/review material
3. Administer exam
4. Student presentations and peer evaluation

**Technology Requirements**

Computer access, internet connection (**stable** and ideally high speed), audio capability (microphone), ability to stream online synchronous meetings/content, ability to share screen for presentation purposes, ability to stream asynchronous lectures, ability to support video conferencing software (e.g. Zoom).

## Evaluation

Instructional/teaching summary #1 (ITS1) assignment:.....	10%
Instructional/teaching summary #2 (ITS2) assignment:.....	10%
Scientific literature review (SLR) assignment:.....	30%
Individual Presentation*:.....	20%
EXAM:.....	30%

\*: Each student presentation is worth 17%. Student attendance to all but one of the Zoom presentation lectures is worth 1.5% and student participation (i.e. asking questions following a presentation) is worth 1.5%. Therefore  $17\% + 1.5\% + 1.5\% = 20\%$

## Important Dates

**ITS1 Deadline:** 1 PM, Friday Jan 28<sup>th</sup> 2022 (1 PM, submit via eClass)  
**ITS2 Deadline:** 1 PM, Tuesday Feb 15<sup>th</sup> 2022 (1 PM, submit via eClass)  
**EXAM:** Thursday March 3<sup>rd</sup> 2022 (**administered via eClass**)  
**Deadline for SLR assignment:** Tuesday March 8<sup>th</sup> 2022 (1 PM, submit via eClass)  
**Presentation Schedule:** TBA (picked by lottery)

**Drop Deadline:** March 18<sup>th</sup> 2022 (last date to drop without receiving a grade)  
**Course Withdrawal Period:** March 19<sup>th</sup> – April 9<sup>th</sup> 2022 (receive a grade of “W” on transcript)

**NOTE:** for additional important dates such as holidays, refer to the “Important Dates” section of the Registrar’s Website at <https://registrar.yorku.ca/enrol/dates/>

## Resources

**Textbook:** No textbook is required. Research articles and other material will be posted on the eClass site for BIOL 4340

### Useful Texts:

1. Biology of Fishes (2<sup>nd</sup> or 3<sup>rd</sup> Ed.) Carl E. Bond, ISBN: 0-03-070342-5
2. Fishes – An Introduction to Ichthyology (5<sup>th</sup> Ed.) Moyle BM & Cech JJ<sup>Jr</sup>, ISBN: 0-13-100847-1

**eClass and York University Libraries**

## Learning Outcomes

Upon successful completion of this course, students should be able to:

1. Discuss what a fish is using specific characteristics that unify the group.
2. Discuss the diversity of fishes in terms of distribution, morphology, adaptations and habitats.
3. Define major fish clades based on their respective major unifying characteristics.
4. Discuss the evolution of chordates within a piscine framework.
5. Discuss the biology of jawless fishes, in particular extant forms.
6. Discuss the success of modern fishes, and in particular teleosts.
7. Discuss the organismal physiology/biology of fishes as it relates to the endocrine system, osmoregulation, locomotion, sensory systems, behaviour etc.
8. Further develop written and oral communication skills as well as the ability to search, read and interpret scientific literature.

## Course Content

This course considers the biology of the largest and most diverse group of vertebrates on the planet, fishes. The course will provide factual and conceptual information about this group of animals and examine far-reaching interests from classical ichthyology to recent developments as well as rapidly growing fields. In this course, we consider both living and fossil forms (although primarily living), surveying distribution, morphology, adaptations and habitats as well as classification and evolution of the group. In addition, general topics that relate to organismal biology/physiology will be discussed such as osmoregulation, locomotion, sensory systems, endocrine system, excretory systems etc.

Course Week	Calendar Week(s)	Topic(s)	Notes
1	Jan 10 <sup>th</sup> - 14 <sup>th</sup>	1. Introduction to Class 2. Distribution 3. Morphology I	<b>Synchronous meet:</b> Thurs Jan 13 <sup>th</sup>
2	Jan 17 <sup>th</sup> - 21 <sup>st</sup>	4. Morphology II 5. Unique habitats & Adaptations	<b>Synchronous meet:</b> Thurs Jan 20 <sup>th</sup>
3	Jan 24 <sup>th</sup> - 28 <sup>th</sup>	6. Classification & Evolution I 7. Classification & Evolution II	<b>Synchronous meet:</b> Thurs Jan 27 <sup>th</sup> <b>ITS1 DEADLINE:</b> 1 PM, Fri Jan 28 <sup>th</sup> (submit via eClass)
4	Jan 31 <sup>st</sup> - Feb 4 <sup>th</sup>	8. Endocrine systems 9. Osmoregulation	<b>Synchronous meet:</b> Thurs Feb 3 <sup>rd</sup>
5	Feb 7 <sup>th</sup> - 11 <sup>th</sup>	10. Guest Lecture (TBA) 11. Locomotion	<b>Synchronous meet:</b> Thurs Feb 10 <sup>th</sup>
6	Feb 15 <sup>th</sup> - 19 <sup>th</sup>	12. Sensory systems (a) Vision (guest) (b) Mechanosensory (c) Electrosensory	<b>Synchronous meet:</b> Thurs Feb 17 <sup>th</sup> <b>ITS2 DEADLINE:</b> 1 PM, Tues Feb 15 <sup>th</sup> (submit via eClass)
7	Feb 21 <sup>st</sup> - 25 <sup>th</sup>	<b>READING WEEK</b>	
8	Feb 28 <sup>th</sup> - Mar 4 <sup>th</sup>	13. Review 14. <b>EXAM</b>	<b>Synchronous meets:</b> Review, Tue March 1 <sup>st</sup> <b>EXAM:</b> Thurs March 3 <sup>rd</sup> (via eClass)
9	Mar 7 <sup>th</sup> - 11 <sup>th</sup>	15. Individual presentations	<b>Synchronous meets:</b> Tue March 8 <sup>th</sup> Thurs March 10 <sup>th</sup>
10	Mar 14 <sup>th</sup> - 18 <sup>th</sup>	15. Individual presentations	<b>Synchronous meets:</b> Tue March 15 <sup>th</sup> Thurs March 17 <sup>th</sup>
12	Mar 21 <sup>st</sup> - 25 <sup>th</sup>	15. Individual presentations	<b>Synchronous meets:</b> Tue March 22 <sup>nd</sup> Thurs March 24 <sup>th</sup>
13	Mar 28 <sup>th</sup> - April 1 <sup>st</sup>	15. Individual presentations	<b>Synchronous meets:</b> Tue March 29 <sup>th</sup> Thurs March 31 <sup>st</sup>
14	April 4 <sup>th</sup> - 8 <sup>th</sup>	15. Individual presentations	<b>Synchronous meets:</b> Tue April 5 <sup>th</sup> Thurs April 7 <sup>th</sup>

## Course Policies

### Policies for Accommodation and Accessibility

- The administration and execution of BIOL 4340 commits to principles of respect, inclusion and equality of all persons with disabilities. Where accommodation/s is/are required, the course director should be provided with as much advance notice as possible so that a mutually agreeable plan of action can be put in place. This will ensure that any impediment to receiving necessary academic accommodations that meet the needs of a student is avoided.
- If a student is aware of an accessibility issue with respect to the execution of BIOL 4340 (e.g. student is located in a different time zone, limited/intermittent internet access etc.), the course director should be notified as early as possible so that a plan of action can be put in place.

### Policy for a Late ITS1 or ITS2 Assignment: READ CAREFULLY and ENTIRELY

- If the **ITS1** Assignment is not submitted by the deadline, a deduction of 5% will be allotted for each 12 hour period within which the assignment is late (up to a maximum of 48 hours).
- If the **ITS1** assignment is more than 48 hours late, **ZERO (0%)** will be assigned for this graded component of the course.
- If the **ITS2** Assignment is not submitted by the deadline, **ZERO (0%)** will be assigned for this graded component of the course.

### Policy for Late SLR Assignment: READ CAREFULLY and ENTIRELY

If a **SLR** Assignment is not submitted by the deadline, a deduction of 5% will be allotted for each 12 hour period within which the assignment is late (up to a maximum of 72 hours). If a **SLR** Assignment is more than 72 hours late, **ZERO (0%)** will be assigned for this graded component of the course.

### Policy for Missed Individual Presentation: READ CAREFULLY and ENTIRELY

- If a student misses a scheduled presentation date/time it is **VERY UNLIKELY** that this evaluated component of the course can be re-scheduled for an alternate date/time during regularly scheduled class time
- If a student misses a scheduled presentation date/time, and it cannot be re-scheduled during regularly scheduled class time, the presentation can be given to the course director only and will be worth 60% of the original presentation (i.e. there will be no peer evaluation mark)
- If a student misses a scheduled presentation **AND** a re-scheduled presentation, the individual presentation mark will automatically be **ZERO (0%)**

### Policies for a Missed Exam: READ CAREFULLY and ENTIRELY

- If a student misses an Exam, there will be **NO** opportunity to take a make up exam
- A student who misses an Exam must notify the course director **within (no later than) 24 hours** of/following the missed Exam start time.
- A student who misses an Exam will have an opportunity to complete a **Make Up Assignment** (Essay) *in lieu* of an exam, to be submitted **no later than one week** following the missed Exam date. The topic of the Make Up Assignment (Essay) will be provided **within 24 hours** of the student notifying the course director of the missed exam.
- No documentation/reason is requested/required for a missed Exam.
- The format of the Make Up Assignment (Essay) *in lieu* of a missed exam can be found in the "Other Information" section of the BIOL 4340 Course Outline.
- A mark of **ZERO (0%)** will be assigned for this graded component of the course if;
  - a student does not notify the course director of their intent to complete a make up assignment **within 24 hours of the missed exam**
  - a student **submits the assignment late**

## Course Policies (continued)

### Policy for Missed/Late Make Up Assignment *in lieu* of Exam: READ CAREFULLY and ENTIRELY

- A Make Up Assignment *in lieu* of an Exam is a final opportunity to acquire a mark for a missed Exam and no documentation will provide an additional opportunity.
- If a Make Up Assignment *in lieu* of an Exam is submitted late, it will not be marked and a **ZERO (0%)** will be assigned to this evaluated component of the course.

## Other Information

### Format of Instructional/Teaching Summary (ITS1 & ITS2) assignments

- The purpose of each of these assignments will be to generate an instructional/teaching summary based on an individual peer reviewed journal article (journal publication).
- The paper/journal publications for each assignment will be provided by the course director.
- The assignment will be no more than two (2) pages in length.
- The assignment **MUST BE in the student's own words**
- The assignment will communicate information that might include
  1. A brief preamble for context (background information)
  2. Reasons/s for the study
  3. Experimental approach/es taken
  4. Results and conclusion/s of the study etc.
- The idea is to produce a 2 page document that could be used to instruct/teach the topic (journal article content) to a 4<sup>th</sup> year class of fish biology students.

### Format of Scientific Literature Review (SLR) assignment

- The Scientific Literature Review (SLR) Assignment is an essay-style assignment based on a fish biology related topic. The course director will provide a list of topics that you can choose from (see eClass), **OR** you can propose your own topic (to be approved by the course director).
- To secure a topic, email the course director with a list of your top four (4) topic choices and you will get an email confirming which topic will be yours (**note**: Topics are confirmed on a first come first serve basis, therefore the topic you end up with may not be your 1<sup>st</sup> choice)
- The **SLR** Assignment is expected to be a 10-12 page document
- The 10-12 pages will include diagrams/figures and the reference list, but it does not include the title page. The essay will articulate a topic **in the student's own words** and will be in the style of a scientific literature review.
- The SLR will require the use of primary literature (e.g. research articles from peer reviewed scientific journals), which can be sourced online via the York University library. The use and citation of non-peer reviewed sources (e.g. websites etc.) is not acceptable unless permission is given. Please check with the course director if you intend to use one (or more) of these.

The format (and marking scheme) of the **SLR** assignment will be as follows:

Abstract – 5%

Introduction – 15%

Discussion (with subheadings) – 40%

Conclusion – 10%

References – 15%

Overall (e.g. presentation, figure use, figure quality etc.) – 15%

## Other Information (continued)

### Format (and Expectations) of Exam

- The BIOL 4340 Exam will be presented/administered via eClass.
- Once a student opens the exam on eClass, this exam will be marked and used as part of the overall grade whether the student completes it or not.
- **No opportunity to conduct a Make Up Assignment *in lieu* of an exam** (see below) will be provided to a student who has opened an exam on eClass, whether it is completed or not.
- A student is expected to complete the BIOL 4340 Exam as they would if the evaluation were being administered in person, in accordance with all University policies on *Academic Honesty and Integrity* (see “University Policies” section). That is, the BIOL 4340 Exam must be completed by the student registered in the class without the use of **any** study aid/s (e.g. course notes, internet search etc.) and without any **discussion/consultation** with other individuals.
- **Any indication** that a student has completed the BIOL 4340 Exam in a manner that violates exam expectations will result in an exploratory meeting at the unit level to determine whether or not there are reasonable and probable grounds to proceed with a charge of breach of academic honesty.
- The BIOL 4340 Exam will be composed of written answer questions only (i.e. question to be answered with short essay-style writing). Written answer questions will require the student to provide an answer **in the student’s own words** and this will be in full sentences (i.e. point form answers will not be accepted).

### Format of Make Up Assignment *in lieu* of an Exam

- A Make Up Assignment *in lieu* of a missed exam will be an approximately eight to ten (8-10) page essay. This will include diagrams/figures and the reference list but it does not include the title page.
- Format will be 1.5 line spacing and 12 point font.
- The topic will be assigned by the course director.
- The assignment will articulate a topic **in the student’s own words** and will be in the style of a scientific literature review (for details see “*Format of Scientific Literature Review (SLR assignment)*” section).
- The assignment will require the use of primary literature (e.g. research articles from peer reviewed scientific journals), which can be sourced online via the York University library.
- Because this is an assignment *in lieu* of a missed exam, no further guidance will be provided (just as an exam has instructions at the start, after which a student is on their own)

### Format of in-text and reference list citation style

- All submitted work in BIOL 4340 that requires in-text citation and a reference list should adhere to the in-text and reference list citation style of the ***Journal of Fish Biology***. A document detailing how to execute this will be posted on the BIOL 4340 eClass site.

### Plagiarism

- Make sure that you are well versed in definitions of **verbatim** (direct), **mosaic** as well as **paraphrasing** plagiarism so that you can avoid these in your submitted work. The presence of plagiarism in submitted work breaches academic honesty guidelines and would have to be pursued in accordance with said guidelines.

## University Policies

### **Academic Honesty and Integrity**

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (<http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website at - <http://www.yorku.ca/academicintegrity/>

### ***A note on sharing assignments, tests, exams:***

Numerous students in Faculty of Science courses have been charged with academic misconduct when materials they uploaded to third party repository sites (e.g. Course Hero, One Class, etc.) were taken and used by unknown students in later offerings of the course. The Faculty's Committee on Examinations and Academic Standards (CEAS) found in these cases that the burden of proof in a charge of aiding and abetting had been met, since the uploading students had been found in all cases to be wilfully blind to the reasonable likelihood of supporting plagiarism in this manner. Accordingly, to avoid this risk, students are urged not to upload their work to these sites. Whenever a student submits work obtained through Course Hero or One Class, the submitting student will be charged with plagiarism and the uploading student will be charged with aiding and abetting.

Note also that exams, tests, and other assignments are the copyrighted works of the professor assigning them, whether copyright is overtly claimed or not (i.e. whether the © is used or not). Scanning these documents constitutes copying, which is a breach of Canadian copyright law, and the breach is aggravated when scans are shared or uploaded to third party repository sites.

### **Access/Disability**

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Students in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

Additional information is available at the following websites:

Counselling & Disability Services - <http://cds.info.yorku.ca/>

Counselling & Disability Services at Glendon - <https://www.glendon.yorku.ca/counselling/>

York Accessibility Hub - <http://accessibilityhub.info.yorku.ca/>

### **Religious Observance Accommodation**

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately. Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete and submit an [Examination Accommodation Form](#) at least 3 weeks before the exam period begins. The form can be obtained from Student Client Services, Student Services Centre or online at [http://www.registrar.yorku.ca/pdf/exam\\_accommodation.pdf](http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf)

## University Policies (continued)

### **Student Conduct in Academic Situations**

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at - <http://secretariat-policies.info.yorku.ca/policies/disruptive-andor-harassing-behaviour-in-academic-situations-senate-policy/>