

Department of Biology Course Outline

SC/BIOL 3030 4.00 Physiology of the Invertebrates
Fall 2019/2020

Course Description

A treatment of the physiology of major invertebrate phyla with emphasis on interphyletic relationships. Laboratory exercises address the diversity and physiology of invertebrates. Three lecture hours, three laboratory hours. One term. Four credits.

Prerequisites

SC/BIOL 2030 4.00.

Course Instructors and Contact Information

Course Director

Dr. Andrew Donini
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Teaching Assistants

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Schedule

Lecture Times: Tuesdays and Thursdays: 8:30am to 10am in PSE 321

Lab Times: Tuesday 2:30pm to 5:30pm Lumbers 117
 Wednesday 2:30pm to 5:30pm Lumbers 117
 Thursday 2:30pm to 5:30pm Lumbers 117

Labs are a mandatory component of BIOL 3030

You MUST attend the lab section in which you are registered.

Evaluation

Lecture Test 1 September 26 th (in CLH K)	20%
Lecture Test 2 October 31 st (in ACW 004)	20%
Lecture Test 3 November 26 th (in CB 121)	20%
Full Lab Report 1 (Earthworm) Due: October 8 th /9 th /10 th	10%
Full Lab Report 2 (Proteins/Nitrogenous wastes) Due: October 22 nd /23 rd /24 th	10%
Full Lab Report 3 (Malpighian tubules) Due: November 5 th /6 th /7 th	10%
Full Lab Report 4 (Daphnia) Due: November 19 th /20 th /21 st	10%

Important Dates

See Evaluation above for due dates of labs and exams.

Drop Deadline: November 8th, 2019

Course Withdrawal: November 9th to December 3rd, (withdraw from course and 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/fw19>

Resources

There is no text book for this course. Most lecture material is sourced from primary literature (published, peer reviewed papers) and from books which are in the Steacie Science and Engineering Library.

There is no lab manual. The 4 lab protocols are posted on Moodle and students are expected to download and print them prior to the lab session.

Moodle website: Lecture slides will normally be posted before class. Extra resources (e.g. videos, pictures) may be posted for classes and labs.

Learning Outcomes

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

1. Explain how specific invertebrates are important to our society from an economic standpoint and from a health perspective.

Assessment: written tests and lab reports

2. Describe the morphology and associated physiology of invertebrate adaptations to locomotion, feeding, the maintenance of solute balance, extreme environments and the processing of sensory information through the nervous system.

Assessment: written tests and laboratory experiments with associated written reports.

3. Describe and carry out various experimental techniques and explain how to apply them to solve physiological questions.

Assessment: laboratory experiments with associated written reports, written tests.

4. Write concise, clear descriptions of physiological processes and write concise, clear scientific reports including analysis and presentation of data.

Assessment: written tests, laboratory reports

Course Content

The invertebrates are a medically, economically and ecologically important group of animals. A number of invertebrates act as pathogens or vectors of disease. Malaria is one of the most important diseases in the world and is caused by a protozoan that is transmitted by anopheline mosquitoes. Economically speaking, invertebrates can be detrimental, serving as pests that destroy crops, but can also benefit us by serving as sources of food (eg. shrimp, lobster). Ecologically, invertebrates are an integral part of the food chain and can be utilized as bioindicators. Therefore, it is in our best interest to study and understand the unique physiological processes of each phylum.

Lecture Schedule:

Sept. 5th: Introduction, Importance of Invertebrates
Sept. 10th: Physiology defined
Sept. 12th: Classification of Invertebrates
Sept. 17th: Unicellular Eukaryotes: Osmoregulation
Sept. 19th: Unicellular Eukaryotes: Locomotion
Sept. 24th: Unicellular Eukaryotes: Feeding
Sept. 26th: TEST 1
Oct. 1st: Porifera: Cell types, Architecture
Oct. 3rd: Porifera: Glass sponge, Histoincompatibility, Reproduction
Oct. 8th: Ammonia Excretion Mechanisms of Invertebrates
Oct. 10th: Cnidaria: Cell types, nematocyst discharge
Oct. 15th and Oct 17th READING WEEK, NO CLASSES, NO LABS
Oct. 22nd: Cnidaria: Finish nematocyst discharge, Anthozoan aggression
Oct. 24th: Mechanoreceptors of Nematoda
Oct. 29th: Platyhelminthes and Tubeworms
Oct. 31st: TEST 2
Nov. 5th: Mollusca: Squid Jet Propulsion
Nov. 7th: Mollusca: Chromatophores, Iridiphores
Nov. 12th: Regeneration in Flatworms
Nov. 14th: Echinoderms
Nov. 19th: Arthropoda I Introduction and Endocrinology of Molting
Nov. 21st: Arthropoda II Endocrinology of Ecdysis
Nov. 26th: TEST 3

Laboratory Schedule:

Sept. 17, 18, 19: Earthworm Crop and Gizzard Part 1
Sept. 24, 25, 26: Tutorial for Data Analysis
Oct. 8, 9, 10: Metabolism of Proteins
Oct 22, 23, 24: Malpighian tubules
Nov. 5, 6, 7: Daphnia

Experiential Education and E-Learning

Supplementary lecture material on Moodle.
Laboratory Procedures on Moodle.

Other Information

None

Course Policies

Policy for Tests:

- There are **3 Tests, Sept 26th, Oct. 31st and Nov. 26th**. The tests are worth 20% each.
- **For those that write the 3 tests, at the discretion of the course director the following policy may be applied:** the test with the lowest grade is worth 10%, the test with the highest grade is worth 30% and the remaining test is worth 20%.
- **If you miss 1 test:** of the remaining 2 tests, the test with the lowest grade is worth 35% and the test with the highest grade is worth 15%.
- **If you miss 2 tests,** the single test you write will be worth 30% and you will earn a grade of zero worth 30%.
- **If you miss All 3 tests,** You will earn a zero worth 60%.
- ***There are NO EXCEPTIONS to this Policy. No explanation or documentation is requested or required for missing tests. The Policy will be applied as outlined above.***

Policy on Laboratories: Laboratories are MANDATORY:

- **There are 5 laboratory meetings in Total and ALL 5 are Mandatory. (See the schedule for dates and plan ahead)**
- If you **miss a laboratory meeting** you will be provided with data from the lab and you will be permitted to write the associated laboratory report; however, the maximum grade you may receive for the report is 5/10 (if you earn 100% on the written report).
There are NO EXCEPTIONS to this Policy. No explanation or documentation is requested or required for missing laboratories. The Policy will be applied as outlined above.

Policy on Late Laboratory Reports:

- There are **4 Laboratory Reports each worth 10%** of the final course grade. (See the schedule for due dates)
- You are provided with **2 weeks** from the time you complete the laboratory to the time the report is due for each of the 4 laboratory reports.
- You **MUST** submit an **electronic version of your report on Moodle** to the link provided by the **Due DATE and TIME.**
- You **MUST also submit a printed version of your report to your Teaching Assistant by the Due DATE and TIME.**
- If you submit a report **AFTER the Due DATE and TIME**, 10% of the final earned grade will be deducted for each 24 hour period that it is late. **Example (does not include all permutations):** The due date is Oct. 8th at 2:30pm. You submit the report to Moodle at 2:31pm on Oct. 8th (date stamped), you submit the printed report to your TA at 2:30pm on Oct. 8th. Your final earned grade for the report is 90/100. 9 marks will be deducted. The final earned grade is 81/100.

There are NO EXCEPTIONS to this Policy. No explanation or documentation is requested or required for late laboratory reports. The Policy will be applied as outlined above.

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.

Student's 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 - <http://www.glendon.yorku.ca/counselling/personal.html>

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

Ethics Review Process

York students are subject to the York University *Policy for the Ethics Review Process for Research Involving Human Participants*. In particular, students proposing to undertake research involving human participants (e.g., interviewing the director of a company or government agency, having students complete a questionnaire, etc.) are required to submit an *Application for Ethical Approval of Research Involving Human Participants* at least one month before you plan to begin the research. If you are in doubt as to whether this requirement applies to you, contact your Course Director immediately.

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 an Examination Accommodation Form, which can be obtained from Student Client Services, Student Services Centre or online at http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf (PDF)

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-and-or-harassing-behaviour-in-academic-situations-senate-policy/>