

University of Toronto Scarborough – Department of Biological Sciences
BIOB34 – Animal Physiology – Summer 2019

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Course Description: An introduction to the principles of animal physiology rooted in energy usage and cellular physiology. A comparative approach is taken, which identifies both the universal and unique mechanisms present across the animal kingdom. Metabolism, respiration, circulation, water regulation, movement and neural circuits are the areas of principal focus.

Prerequisites: BIOA01H3 and BIOA02H3 and CHMA10H3 and CHMA11H3

Exclusions: (BIOB30H3), BIO270H, BIO204H

Lectures: Wednesdays 7:10-9pm, HL B101

Tentative Lecture Topics:

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|------------------------------------|----------------------------|
| 1 – What are Animals? | 5 – Nitrogen Excretion |
| 2 – Metabolism | 6 – Respiratory Physiology |
| 3 – Thermal Physiology | 7 – Osmoregulation |
| 4 – Feeding & Digestive Physiology | 8 – Nervous Physiology |

Lecture notes will be posted (in PowerPoint format only) on Quercus at least 24 hours before each lecture. NOTE: I reserve the right to make changes to the lecture notes after they are posted.

Tutorials: Wednesdays 12:10-1pm, HL B101

The tutorial on May 8th will be used for a brief lecture and introduction to the course; the tutorial on May 15th will be used for a presentation and introduction to tutorials; regular tutorials will begin on May 22nd.

Textbooks:

The following textbooks are available at the UTSC Bookstore:

Required textbook: *Ontario Nature Guide*, 2008, by K. Kagume; this textbook will be used for the tutorial assignments.

Optional textbook: *Animal Physiology*, 4th edition, 2016, by R.W. Hill et al; this textbook can be used by students to supplement their lecture notes, if desired; I will post suggested readings, where applicable, from this textbook; however, this textbook may discuss material not covered in class, and I may discuss material in class not covered by the textbook; you are only responsible for the material covered in class.

Evaluation:

Term Tests	35%	(25% best; 10% worst)
Tutorial Assignments	30%	(7 best x 4.3% each)
Final Exam	35%	

Important Notes Regarding Evaluations:**Term Tests**

There are two Term Tests in this course, which are held outside of class time. The dates and times of the Term Tests will be determined by the Registrar's Office during the first few weeks of the semester, and I will post this information on Quercus as soon as it is available.

Term Tests may examine any material covered in this course, but the lectures emphasized on each Term Test will be announced in class and on Quercus. Term Tests will be 2 hours and will comprise of multiple choice questions only. Students will have choice with regards to which questions they answer (e.g., answer 24 of 30 multiple choice questions). **The Term Test questions will require students to think critically and creatively about the lecture content as students will be expected to explain novel observations and solve problems. This reflects my belief that undergraduate students need to develop not only their scientific knowledge but, more importantly, their competency for thinking, reasoning, and scientific inquiry.**

To help students prepare for the Term Tests, optional quizzes (here optional means not worth any marks) will be posted on Quercus each week. *Students are strongly encouraged to discuss these quizzes with the course instructor when they encounter any difficulties, either by email or during office hours (preferred).*

If you know in advance that you cannot write a Term Test at the scheduled time because it conflicts with some other valid activity, please notify the course instructor as soon as possible so that arrangements can be made for you to write the Term Test at an alternative time. *Any such alternative time must be before the scheduled date of the Term Test.*

If you miss a Term Test due to medical illness, then you must submit a detailed UTSC Medical Certificate filled out by the physician who saw you on the day of the Term Test. This note must be submitted to the course coordinator as soon as possible following the Term Test, whether in person or via email. Other medical notes will not be accepted, and if the UTSC Medical Certificate is not completed to the satisfaction of the course coordinator, it may be refused. The UTSC Medical Certificate can be found via the following link:

http://www.utsc.utoronto.ca/~registrar/resources/pdf_general/UTSCmedicalcertificate.pdf.

If you miss a Term Test for any other valid reason, please consult with the course coordinator as soon as possible. The course coordinator will determine whether the reason given for a missed Term Test is valid in accordance with university policies. Also, the course coordinator may ask for any documentation required to verify the reason given.

Students who miss one Term Test for a valid reason (medical or otherwise) will not be permitted to write a make-up Term Test; rather, the weight of their Final Exam will be increased to 45%. (The weight of their remaining Term Test will be 25%).

Students who miss both Term Tests for valid reasons will not be permitted to write make-up Term Tests; rather, the weight of their Final Exam will be increased to 65.7%, and, in addition, they will be required to complete an additional tutorial assignment (both Knut- and Schmidt-Nielsen approaches; worth 4.3% of their final grade), which will be due no later than the last day of classes (Tuesday, August 6th by 11:59pm).

Students who miss a Term Test for any invalid reason will receive a grade of zero for that Term Test.

Tutorial Assignments

The tutorials for this course have three primary objectives:

- i) to familiarize students with the diversity of animals on Earth (esp. in Ontario);
- ii) to acquaint students with the primary scientific literature; and,
- iii) to develop students' ability to design experiments, esp. with regards to choosing model species and promoting the relevance of a research project.

Students may complete tutorial assignments alone or in a group of up to 3 students. (Larger groups will not be permitted, so please do not ask.) These tutorial assignments are due by the start of the lecture on the same day of the tutorial session and must be submitted via Quercus. Late submissions will not be accepted. For group submissions, only one student should submit the assignment, but the name and student number of all contributing students should be listed in the comments.

Each tutorial assignment is worth 10 marks.

The tutorial session on May 15th will be used to deliver a presentation about August Krogh and Knut Schmidt-Nielsen, two prominent physiologists whose life and work has inspired these tutorials. Regular tutorials will begin on May 22nd. Regular tutorials will each have the same format:

Upon arrival to the tutorial session, students will be presented with a brief description of an animal, and, using their *Ontario Nature Guide*, they will identify the animal to the species level (both common and Latin names must be provided).

Correct identification of the animal will earn the student 3 marks; incorrect identification of the animal will earn the student 1 mark; failure to complete this portion of the tutorial assignment will earn the student 0 marks. NOTE: Incorrect identification of the animal will not impact the grade received on the remainder of the tutorial assignment.

Once students have identified the animal, they will subsequently complete one of the following exercises:

i) Krogh Principle-based Experimental Design:

This assignment has been inspired by the August Krogh Principle. For this assignment, students must identify one specialized/unique physiological characteristic that is possessed by the animal species identified at the start of the tutorial and must propose an experiment that aims to determine the underlying basis for this specialized physiological trait. Each proposal must include a statement describing the chosen physiological characteristic, a hypothesis, a description of the control and experimental groups, and a brief account of the methodology that could be used.

ii) Schmidt-Nielsen-based Statement of Significance to Humans:

This assignment has been inspired by the life and work of Knut Schmidt-Nielsen, the father of comparative animal physiology. For this assignment, students must find a published study (in the primary scientific literature, not secondary sources) that involved the animal species identified at the start of the tutorial, and must explain how the results of the study are relevant to humanity; i.e., how can the lives of human beings be improved by the knowledge gained through this study? Whenever possible, students should select papers that focus on the animal's physiology, rather than ecology or cell biology.

The Krogh and Schmidt-Nielsen portions of the tutorial assignments will be graded as follows:

If the TA is satisfied with the quality of the submission, and believes that it cannot be significantly improved, it will be awarded 7 marks. No feedback will be provided to the students.

If the TA is satisfied with the quality of the submission, but believes that it could be significantly improved, it will be awarded 4 marks. Feedback on specific improvements that could be made will be provided to help with subsequent assignment submissions.

If the TA is dissatisfied with the quality of the submission, either because it is lacking required elements or because it does not meet the standard expected of a 2nd-year student at UTSC, it will

be awarded 1 mark. Feedback on specific improvements that could be made will be provided to help with subsequent submissions.

If no assignment is submitted, it will be awarded 0 marks.

Because only the best 7 tutorial assignments count towards a student's final grade in this course, students can miss up to 3 tutorials without penalty. If, due to medical illness, students miss more than 3 tutorials, then they must submit a UTSC Self-Declaration of Illness Form, which can be found at the link below, to the course coordinator as soon as possible:

https://www.utoronto.ca/biosci/sites/utoronto.ca/biosci/files/u26/Self%20Declaration%20of%20Student%20Illness_0.pdf.

Since 3 tutorials can be missed without penalty, only two Self-Declaration of Illness Forms can be submitted for this course (meaning students can miss up to 5 total tutorials without penalty due to illness). The weight of any missed tutorials counting towards the student's grade will be shifted to the Final Exam.

Final Exam

The Final Exam will be scheduled by the Registrar's office (August 10-23) and will be worth 35% of the final grade (unless, for reasons stated above, it has a higher weight). It will be 3 hours and will cover all course material, though it will place emphasis on the material discussed since the last Term Test. It will have the same format as the Term Tests.

Accessibility Needs:

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services Office as soon as possible. I will work with you and AccessAbility Services to ensure you can achieve your learning goals in this course. Enquiries are confidential. The UTSC AccessAbility Services staff (located in S302) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (416) 287-7560 or ability@utsc.utoronto.ca.

Academic Integrity:

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's *Code of Behaviour on Academic Matters* (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

- In papers and assignments:*
- using someone else's ideas or words without appropriate acknowledgement
 - submitting your own work in more than one course without the permission of the instructor
 - making up sources or facts
 - obtaining or providing unauthorized assistance on any assignment.
- On tests and exams:*
- using or possessing unauthorized aids;
 - looking at someone else's answers during an exam or test
 - misrepresenting your identity
- In academic work:*
- falsifying institutional documents or grades
 - falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. There are other offences covered under the Code, but these are the most common. ***Please respect these rules and the values that they protect.***

Copyright in Instructional Settings:

If a student wishes to audio-record, photograph, video-record, or otherwise reproduce lecture presentations, course notes, or other similar materials provided by instructors, he or she must obtain the instructor's written consent beforehand. Otherwise, all such reproduction is an

infringement of copyright and is absolutely prohibited. In the case of private use by students with disabilities, the instructor's consent will not be unreasonably withheld.