

# BIOD43 Animal Locomotion and Exercise

Winter 2021

## Instructor Information

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## General Information

### Description

A lecture and seminar/discussion course covering integrative human and comparative animal exercise physiology. Topics will include muscle physiology, neurophysiology, metabolism, energetics, thermoregulation and biomechanics. These topics will be considered within evolutionary and ecological contexts.

### Learning Objectives/Outcomes

Movement and locomotion are fundamentally important to every aspect of animal biology. Animals must move to forage or capture food, to avoid becoming the next meal for something else, to find and secure a mate, and to raise young. This is a lecture and tutorial-based course intended to help students understand how animals move and how that movement differs among species and individuals based on many **biotic and abiotic factors**.

Learning Outcomes:

On successfully completing this course students will be able to,

- Identify and characterize the diversity (form and function) of muscles and skeletal elements
- Characterize and contrast different styles of locomotion and gaits
- Discuss how the media through which an animal moves interacts/influences the way they move
- Characterize how movement changes to affect changes in speed/direction - and relate this to muscle function/control
- Appreciate and understand how evolution and ecology constrain and shape morphology and physiology in the context of locomotion
- Connect mechanical power output to the metabolic power needed
- Make informed predictions about how both biotic and abiotic factors (alone or in combination) affect mechanical and metabolic power requirements
- Critically assess primary literature in basic exercise or animal locomotion research
- Critically assess how effectively social or news media present exercise or animal locomotion research
- Present exercise or animal locomotion research in an engaging and accurate way

## Evaluation

### Grade Breakdown

- Participation, 10%
- Tutorial Assignments, 15%
- Quizzes, 15% (total)
- Midterm Exam, 15%
- Term Assignment, 30%
- Final Exam (cumulative), 15%

### Participation (10%)

Students will be graded on their appropriate participation during TA-led AND student-led discussions of published primary research.

*How to get an A:* Show up on time, attend all (or nearly all) tutorials, ask questions or offer answers to discussion questions (you don't have to dominate the conversation, but you should make a reasonable effort to participate).

### Tutorial Section Assignments (15%)

Short assignments (e.g. mini-surveys of that week's assigned reading) will be due prior that week's tutorial session. These are designed to get you thinking about the assigned reading so that you are ready to discuss it. In addition, you will complete short peer evaluations/reflections for 3 of your classmates' term assignment presentations. The TA will assign you your peer evaluation slots.

*How to get an A:* Complete assignments on time (a couple of sentences is usually sufficient to answer mini-survey questions, for example), honestly and constructively evaluate your peers' term assignment presentations.

### Quizzes (15% total)

Four short online multiple choice/short answer quizzes will be given at selected point throughout the course. These will cover both lecture materials and articles discussed in the TA-led discussion sections. Quiz dates will be announced at least 1 week ahead of time.

Note: I will allow you to drop your TWO lowest quiz scores (e.g. poor performance, absence).

*How to get an A:* Take at least two of the quizzes. Taking all four is best (learn from your prior performance and improve the odds of getting a least two high scores!).

## Exams

### Midterm Exam (15%)

- The midterm will take place **online at a time TBD**.
  - The midterm will consist of ~15 multiple choice, T/F, matching questions, and 2-3 short-form written answer questions.
  - The midterm will cover It will cover material from **lectures 1-11 and tutorials 1-5 (subject to change)**.

### **Final Exam (15%)**

- The final exam will take place **online at a time TBD**.
  - The final exam will consist of ~45 multiple choice, T/F, matching questions, and 3 short-form written answer questions.
  - The final exam will be cumulative. Approximately 1/3 of the material covered will be from the first half of the course (covered on the midterm) with about 2/3 of the material covered from after the midterm.

All exams/quizzes are closed-note. Please note the UTSC academic integrity policies listed at the end of this document.

**How to get an A:** Take quizzes and learn from past performance. Attend office hours and ask questions. Focus on reviewing notes/lectures, not just to memorize facts/concepts, but to understand the logical framework within which they are presented. Ideally, you should eventually feel comfortable with how the lectures flow: why one slide/idea naturally follows another.

### **Term Assignment: Oral Presentation OR Scientific Podcast (30%)**

#### ***I. Oral Presentation***

Over several weeks in the latter half of the course each student choosing this term assignment will give a short oral presentation of two journal articles (relevant to the topics covered in this class) they have selected, followed by a question/answer session during each discussion section. The TA will evaluate student performance during these presentations AND evaluate the participation and involvement of other students in asking questions of the presenter. More details to come.

#### ***II. Podcast Project***

Students choosing this term assignment will produce their own short visual podcast covering at least two recently published, peer-reviewed journal article (relevant to the topics covered in this class). This podcast will be for a general (non-scientist) audience. The podcast should be narrated by the student and should include selected relevant audio clips and be accompanied by static pictures/figures/tables or short relevant video clips. More details to come.

More details on these assignments will be provided in the first few weeks of the course.

**How to get an A:** Find scientific articles covering animals and/or concepts that interest you! It's easier to get excited presenting work you yourself are passionate about. Several assignments in the lecture/tutorial will help scaffold the process of producing this project. More details to come.

## Lecture Schedule

Posted on Mondays at 2 PM, or Wednesdays at 1 PM, online

Date	Lecture	Topic	Suggested Reading
Jan. 11	1	Introduction - What is locomotion/exercise?	Chapter 1
Jan. 13	2	How animals move and the currencies of life	
Jan. 18	3	Muscle structure I - a review of basic structure and diversity	Chapter 2, 10
Jan. 20	4	Muscle structure II - muscle diversity and support structures	Chapter 2
Jan. 25	5	Muscle mechanical function	Chapter 2
Jan. 27	6	Movement on land I	Chapter 3
Feb. 1	7	Movement on land II	Chapter 3
Feb. 3	8	Movement on land III	Chapter 3
Feb. 8	9	Movement in fluid (water) I	Chapter 4
Feb. 10	10	Movement in fluid (water) II	Chapter 4
Feb. 15		No lecture - Reading week	
Feb. 17		No lecture - Reading week	
Feb. 22	11	Movement in fluid (water) III	Chapter 4
Feb. 24	12	Catch-up/Midterm review Session	
Mar. 1	13	Limbless (snake) locomotion	
Mar. 3	14	Movement in fluid (air) I	Chapter 5
Mar. 8	15	Movement in fluid (air) II	Chapter 5
Mar. 10	16	Movement in fluid (air) III	Chapter 5
Mar. 15	17	Evolution of flight I	
Mar. 17	18	Evolution of flight II	
Mar. 22	19	The challenges of measuring locomotion energetics	Chapter 8
Mar. 24	20	Cellular metabolism (a brief review)	Chapter 8
Mar. 29	21	Fueling metabolism - the integrated picture	Chapter 9
Mar. 31	22	Biotic and abiotic influences on exercise I	Chapter 8, 9
Apr. 5	23	Biotic and abiotic influences on exercise II	Chapter 8, 9
Apr. 7	24	Physical training/Final exam review session	

## Tutorial Schedule

LIVE: Wednesdays 2 - 4 PM, or Thursdays 3 - 5 PM, online

Note: If you are not enrolled in both lecture and one of the two tutorial sections ACORN will automatically drop you from the course.

Date	Disc #	Topic
Jan. 13/14		No discussion section
Jan. 20/21	1	Journal article discussion - led by TA
Jan. 27/28	2	Journal article discussion - led by TA
Feb. 3/4	3	Journal article discussion - led by TA <i>(submit selected term assignment paper and list of references)</i>
Feb. 10/11	4	Oral presentation/podcast workshop
Feb. 17/18		Journal article discussion - led by TA
Feb. 24/25	5	Reading Week - No Discussion Section
Mar. 3/4	6	Tutorial workshop
Mar. 10/11	7	Student presentations
Mar. 17/18	8	Student presentations, cont.
Mar. 24/25	9	Student presentations, cont.
Mar. 31/Apr. 1	10	Student presentations, cont.
Apr. 7/8	11	Student presentations, cont.

## Course Policies

### Required Readings

Electronic versions or links to online repositories of selected readings (e.g. journal articles, etc.) either the lecture and/or the tutorials will be placed on the Quercus course website at least several days prior to the date they will be discussed. In the case of primary literature, a link to the library electronic version will be provided. Students should either print out or (preferably) have the electronic version (PDF) of assigned journal articles with them during discussion sections.

### Quercus

The course Quercus site will be your primary resource for lecture notes, tutorial/lecture readings, assignment instructions, course announcements, posted grades, and for asking content-based questions.

### Lecture Notes

The lecture notes (the slides) will be posted on the course Quercus site the day before (when possible), or immediately after, the lecture. Please let me know if there are any problems accessing these notes. If the lecture is not present on the site, it is not yet ready. You are strongly encouraged to take some notes while I talk about each slide.

## Asking Questions

NOTE: Due to privacy concerns we can only respond to e-mails from official UofT e-mail addresses. E-mails from private addresses will be ignored.

## (Instructor's) Office Hours

By appointment only via the Bb Collaborate app - please see the Quercus site for available times.

## Administrative/Logistical Issues

If you have logistical questions (e.g. missed lecture/exam, etc.), e-mail me ([kenneth.welchjr@utoronto.ca](mailto:kenneth.welchjr@utoronto.ca)) or ask them during office hours.

## Lecture content

If you have questions about lecture content (e.g. “How does concept XXX relate to the difference between example A and example B?”), ask them at office hours or post your question to the course Quercus discussion board. I want all students to benefit from seeing my answer to your question. I will not respond directly to e-mails to me asking course content questions.

## Tutorial-related questions

All tutorial-related questions (e.g. “Are we supposed to answer the questions for both assigned papers, or does question 1 refer only to paper A?”), should be directed to your TA.

## Attendance

Though I cannot take attendance during recorded lectures, I consider attendance a requirement (if you don't pay attention to lectures it will be very difficult to succeed in the course). The TA will take attendance during “live” online tutorials. If you miss tutorial sessions, it will negatively affect your participation score.

## Missed Assignments

Please refer to the official Department of Biological Sciences “[Missed Term Work Policy](#)”.

*Note: Except under special circumstances, students are expected to complete and submit any missed assignment after the illness has passed. This means that all assignments would be due the day after the last day of self-declared absence.*

## What do I do if I miss a term test due to an illness?

If you miss a term test you must provide the [UTSC Verification of Illness Form](#) within 3 days of the term test to Jennifer Campbell ([jac.campbell@utoronto.ca](mailto:jac.campbell@utoronto.ca)), Course Coordinator in Biological Sciences. Please ensure your physician has indicated a clear start date, end date and visit date(s) on the form. Notes that are missing dates or have dates that do not correspond to the test missed will not be accepted.

## What do I do if I am going to miss term work that is not due to an illness?

Examples of possible documentation that can be submitted to Jennifer Campbell (note your documentation must indicate the event will occur on the date of the assignment):

- A death certificate or funeral notice
- A police accident report
- Travel ticket or flight itinerary for non-vacation or personal matters (must include departure and arrival dates and times)
- A letter from a Coach or Varsity Administration for UofT Varsity activities
- Record of a visit to an emergency room
- E-mail sent directly to the Course Coordinator from a Disability Consultant at AccessAbility Service

Samples of reasons that are NOT acceptable include personal travel (vacations), medical prescriptions, weddings, work commitments.

## What do I do if I miss a final exam?

Please review the [Registrar's website](#) for policies and procedures.

## Lateness

Students that are late 10 minutes or more for tutorials are considered absent.

Regardless of absence or lateness, you are still responsible for completion of all assignments (even if you miss a tutorial for legitimate reasons).

## Course Materials

### Required Materials

Need a heading or a bullet? On the Home tab, in the Styles gallery, choose from all styles used in this syllabus.

- Tap to add text.
- Tap to add text.

### Optional Materials

Want to add more tables to your document that look like the Course Schedule and Exam Schedule tables that follow? Nothing could be easier. On the Insert tab, just select Table to add a new table. New tables you create in this template are automatically formatted to match.

### Required Text

Item Name 1 Media Type, Author Name

Item Name 2 Media Type, Author Name

## Additional Information and Resources

### AccessAbility Statement

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.

AccessAbility Services staff (located in Rm AA142, Arts and Administration Building) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations 416-287-7560 or email [ability.utsc@utoronto.ca](mailto:ability.utsc@utoronto.ca). The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

### **Academic Integrity**

The University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters ([www.governingcouncil.utoronto.ca/policies/behaveac.htm](http://www.governingcouncil.utoronto.ca/policies/behaveac.htm)) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences.

Potential offences in papers and assignments include 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 cheating includes using or possessing unauthorized aids, looking at someone else's answers during an exam or test, misrepresenting your identity, or falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

### **Turnitin**

Normally, students will be required to submit their course essays to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site."

Please avoid academic dishonesty and have confidence in your own ability to learn and grow academically by doing your own thinking and writing!