

BIOLOGY 2A03 Integrative Physiology of Animals Winter 2021 Course Outline

Course Details

INSTRUCTOR: Dr. Graham Scott, LSB-227 (scottg2@mcmaster.ca)
OFFICE HOURS: Location/platform, day, and time to be determined.

COURSE AND LAB COORDINATOR: Alastair Tracey, LSB-119 (bioyr2@mcmaster.ca)

LAB TAs: To be determined.

LECTURES: Tue., Wed., and Fri., 12:30-1:20 , Location to be Determined

LABORATORIES: Mon.-Fri., 8:30-11:20 or 2:30-5:20 in LSB 110

Course Description

Fundamental principles of animal physiology, including: cellular energetics, diffusion, osmosis, membrane transport, excitability and contractility, gas exchange, fluid dynamics, electrolyte balance.

Prerequisite(s): Biology 1A03, Biology 1M03; and one of Physics 1A03 (or 1B03) or 1C03, or credit or registration ARTSSCI 2D06 A/B or ISCI 1A24 A/B.

Antirequisite(s): Medical Physics 4XX3

The course will be delivered via live lectures and in-person laboratory activities. Tests will occur during scheduled lecture time. Laboratories will occur during the term as scheduled and seen in each student's Mosaic timetable.

Course Learning Objectives

By the end of this course students will:

1. Have a broad fundamental knowledge and appreciation of animal physiology.
2. Understand the functions of important physiological systems, including the nervous, endocrine, muscular, cardiovascular, respiratory, renal, gastrointestinal, and reproductive systems.
3. Understand how these separate systems can interact and yield integrated physiological responses to challenges, such as exercise, changing environmental conditions, and fasting and feeding.

4. Be able to distinguish some of the key physiological differences between major groups of vertebrate and invertebrate animals.
5. Be able to analyze and produce written reports on experiments and observations in physiology.
6. Be prepared for upper-level courses on more advanced physiological topics and/or experimentation.

Course Schedule

IMPORTANT DATES:

Jan. 6	Classes begin
Jan. 18-22	Lab 1 for EVEN lab sections
Jan. 25-29	Lab 1 for ODD lab sections
Feb. 5	Test #1 during class-time
Feb. 15-21	Mid-term recess
Mar. 12	Test #2 during class-time
Apr. 9	Last class

TENTATIVE LECTURE TOPICS

CHAPTERS (Moyes)	TOPIC
1-2	Introduction to Animal Physiology <i>Integration, form and function, homeostasis, animal evolution</i>
3	Cellular energy metabolism <i>Energy metabolism, enzyme function</i>
3	Cellular membrane transport <i>Diffusion, active transport, membrane potential, epithelia</i>
4	Cell signalling and the endocrine system <i>Chemical messengers, signal transduction, endocrine organs, hormones</i>
5,7,8	Neurons and nervous systems <i>Nervous system organization, graded potentials and action potentials, synaptic transmission, sensory systems, autonomic nervous system</i>
6,12	Muscle function and locomotion <i>Motor proteins, muscle structure, sliding filament model, cross-bridge cycle, excitation-contraction coupling, motor units and recruitment, fibre types</i>
9	Circulatory systems <i>Circulatory systems in animals, cardiac cycle, cardiac muscle function, blood vessels, regulation of blood pressure and flow, capillary filtration, lymphatics</i>
11	Respiratory systems <i>Respiratory systems in animals, ventilation and gas exchange, gas transport to tissues, respiratory pigments, control of ventilation</i>
13	Regulation of ion and water balance <i>Strategies for ionic and osmotic regulation, nitrogen excretion, kidney structure and function, evolutionary diversity of excretory systems</i>

14	Digestion and assimilation of nutrients <i>Digestive systems in animals, motility, secretion, digestion, absorption, regulation of digestive system function, nutrient storage</i>
16	Reproductive physiology <i>Sex determination, gametogenesis, fertilization, ovarian & uterine cycles, copulation, pregnancy, parturition</i>

LAB DETAILS

Lab	Even Sections Lab Dates	Odd Sections Lab Dates	Assignment	Due Date	Marks
Lab 1: Introduction to LabChart 8	Jan. 18-22	Jan. 25-29	Partial lab report - Results	One week after lab at 2:30 pm (hand in to drop box)	4%
Lab 2: Muscle and Electromyography	Feb. 1-5	Feb. 8-12	Partial lab report - Discussion	One week after lab at 2:30 pm (hand in to drop box)	6%
Lab 3: Circulatory Responses to Diving	Feb. 22-26	Mar. 1-5	Full formal lab report	One week after lab at 2:30 pm (hand in to drop box)	8%
Lab 4: Respiratory Gas Exchange in the Mouse	Mar. 8-12	Mar. 15-19	Full formal lab report	One week after lab at 2:30 pm (hand in to drop box)	12%

Please check your schedule to ensure that you know which lab room your section is assigned to. Students must attend the lab section to which they have been assigned. Those with **ACADEMIC CONFLICTS ONLY** should arrange their own lab change through Mosaic prior to the add/drop date. **It is your responsibility to attend the correct lab section and room.** **NOTE: If you are absent from your lab, you may not attend another lab section without previously contacting the course coordinator. If you cannot attend another lab section, you will be required to submit an MSAF.**

In the event of a storm closure check Avenue to Learn for alternate arrangements for those lab sections. Specific information may be sent to your McMaster email address. **NO OTHER EMAIL ADDRESSES WILL BE USED.**

IMPORTANT NOTE

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If any modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes. Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, Avenue to Learn and/or McMaster email.

Course Materials

RECOMMENDED TEXTBOOK: A textbook is not required for this course. Lectures will be based on material in the following textbooks, either of which is recommended as an optional supplemental resource for the course:

Moyes & Schulte, *Principles of Animal Physiology* (3rd edition), Pearson Benjamin Cummings

Stanfield, *Principles of Human Physiology* (4th or 5th edition), Pearson Benjamin Cummings

Lab manuals for each lab will be made available on Avenue to Learn and must be brought to the lab.

* You must bring a USB stick to labs on which to save your data.

Course Evaluation

The Biology 2A03 final grades will be calculated based upon the following course assessments:

MARKS:

30%	2 Tests @ 15% each (written during lecture time); tests are cumulative
30%	Laboratory reports (see the lab details for a detailed breakdown)
40%	Final Exam; exam is cumulative

If the tests and final exam cannot be administered in-person, the course may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

Please discuss any uncertainties about term grades with your TA or the course coordinator **before the final exam is written**. Final grades obtained for 2A03 will be converted according to the scheme used at McMaster University.

90-100%	A+	12	63-66%	C	5
85-89%	A	11	60-62%	C-	4
80-84%	A-	10	57-59%	D+	3
77-79%	B+	9	53-56%	D	2
73-76%	B	8	50-52%	D-	1
70-72%	B-	7	0-49%	F	0
67-69%	C+	6			

Requests for Relief for Missed Academic Term Work

POLICY REGARDING MISSED WORK IN THE FACULTY OF SCIENCE

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.

View the [McMaster Student Absence Form \(MSAF\)](#) for more information.

Undergraduate students who have missed academic work resulting from a medical or personal situation, lasting up to 3 calendar days, may request relief, once per term, without documentation, using the McMaster Student Absence Form (MSAF). Absences for a longer duration or for other reasons must be reported to your Faculty/Program office, with documentation, and relief from term work may not necessarily be granted. When using the MSAF, please put Alastair Tracey as the contact email (bioyr2@mcmaster.ca). Please note that the MSAF may not be used for term work worth 25% or more, nor can it be used for the final examination.

POLICY ON LATE LAB REPORTS

Lab reports are due at 2:30 pm, one week after you performed the exercises. Lab reports must be submitted in hard copy to the correct Bio 2A03 dropbox on the first floor of LSB (near the elevators). It is your responsibility to ensure they are placed in the correct dropbox. Reports received after the deadline or found later in the wrong dropbox, will be penalized at 10% per day. **If a MSAF is provided, students will receive a 3-day extension on the due date of the lab report, but it is your responsibility to contact your TA in advance to make arrangements for submitting the report. IMPORTANT NOTE** – Students MUST complete ALL of the lab components to receive credit for Biology 2A03.

POLICY ON MISSED TESTS

The weight of a missed test will be added to the value of the final exam if a MSAF is provided. Missed tests without a MSAF will receive a grade of zero.

Academic Integrity

Attention is drawn to the Statement on Academic Ethics and the Senate Resolutions on Academic Dishonesty as found in the Senate Policy Statements distributed at registration and available in the Senate Office. Any student who infringes any one of these resolutions will be treated according to published policy.

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. **It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at <https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/>

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work. While students may find it helpful to discuss assignments with each other, it is not acceptable to prepare common answers. **Where laboratories require you to work in groups the data obtained will be all the same, but your treatment of it (tables, graphs, Results & Discussion) must be your own individual work.** Your answers to theory questions, results & discussion & computer derived graphs should be your own. **For example, you and your lab partner(s) cannot print/insert 2 to 4 versions of the same graph(s) in your lab reports even though you are working with the same data. Each student must create and print/insert their own versions of the graphs in biology labs even though their data is the same as their lab partners.**
3. Copying or using unauthorized aids in tests and examinations.

Authenticity/Plagiarism Detection

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. Avenue to Learn, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.).** For more details about McMaster's use of Turnitin.com please go to www.mcmaster.ca/academicintegrity.

Courses with an On-line Element

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn, LearnLink, web pages, capa, Moodle, Echo360, Microsoft Teams, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used.

Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

Online Proctoring

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

Conduct Expectations

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the [Code of Student Rights & Responsibilities](#) (the “Code”). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online.**

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx, Echo360, Microsoft Teams or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students’ access to these platforms.

Academic Accommodation of Students with Disabilities

Students with disabilities who require academic accommodation must contact [Student Accessibility Services](#) (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University’s [Academic Accommodation of Students with Disabilities](#) policy.

Academic Accommodation for Religious, Indigenous or Spiritual Observances (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the [RISO](#) policy. Students should submit their request to their Faculty Office ***normally within 10 working days*** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

Copyright and Recording

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical, and artistic work, **including lectures** by University instructors

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

Extreme Circumstances

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, Avenue to Learn and/or McMaster email.