

## Biology 3U03 Animal Physiology: Homeostasis Winter 2021 Course Outline

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### Course Details

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**Instructor:** Dr. Michael O'Donnell, LSB 530, [odonnell@mcmaster.ca](mailto:odonnell@mcmaster.ca), 905.525.9140 ext. 23103

**Office hours:** Friday 4:30pm-6:30 pm (LSB 530 or via Microsoft Teams)

**Course Coordinator:** Dr. Mihaela Georgescu (LSB 119A; [mgeorg@mcmaster.ca](mailto:mgeorg@mcmaster.ca))

**Lab/TA's:** TBA

**Lectures:** Mondays and Wednesdays 11:30 am - 12:20 pm, Location To Be Determined

**Laboratories:** Tues, Wed, Thu 8:30 - 11:20 am and 2:30 - 5:20 pm in LSB 109 (Lab manual will be available via Avenue 2 Learn.) **NOTE:** Changes from assigned sections may be made for reasons of **academic conflict only**. Students may make their own section switches via MOSAIC. Students who miss a lab may not attend another lab section without previously contacting the course coordinator. Otherwise they will be required to submit an MSAF or a grade of zero will be recorded.

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### Course Description

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- Respiration, circulation, acid-base balance and renal function.  
Two lectures, one lab/tutorial (three hours); one term

**Prerequisite(s):** [BIOLOGY 2A03](#) and registration in Level III or above of any Honours program; or both [BIOLOGY 1A03](#) and registration in Level III or above of Honours Kinesiology. [BIOCHEM 2EE3](#) and [BIOCHEM 3G03](#) are recommended.

*Not open to students registered in the [B.Sc.N.](#), [Bachelor of Health Sciences \(Honours\) \(B.H.Sc.\)](#), [Bachelor of Health Sciences \(Honours\) - Biomedical Sciences Specialization \(B.H.Sc.\)](#), [Bachelor of Health Sciences \(Honours\) - Child Health Specialization \(B.H.Sc.\)](#), or [Bachelor of Health Sciences \(Honours\) - Global Health Specialization \(B.H.Sc.\)](#), or with credit or registration in [HTHSCI 2F03](#) or [2FF3](#).*

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### Course Learning Objectives

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- The focus of this course is homeostasis in systems physiology and the mechanisms which achieve it. This course will cover the regulation of the cardiovascular system, the maintenance of fluid and electrolyte balance, kidney function, the principles of acid-base homeostasis, and respiratory function and ventilatory control systems. Aspects of animal metabolism will also be

covered. The emphasis will be on higher vertebrates, principally mammals, but many examples and some laboratory exercises will employ non-mammalian vertebrates so as to provide a broader coverage for the course.

- By the end of this course students will be introduced to the interrelationships between the heart, lungs, kidney and autonomic nervous system in achieving homeostasis.
- **IMPORTANT NOTE:** This course involves mandatory laboratory exercises involving the use of animals. In one exercise, animals will be sacrificed (painlessly) as part of the experiment. Other exercises involve experiments on the human body (your own). **IF YOU HAVE OBJECTIONS TO ANY OF THESE PROCEDURES, YOU SHOULD NOT TAKE THIS COURSE.**

## Course Schedule

Week(s) Lecture Topic: 1.Circulation & Pressure-Flow Relationships, 2.Compliance, Distensibility, & Cardiac Physiology, 3.The Cardiac Cycle, 4.Cardiac Output and Starling's Law, 5 & 6. Circulatory Control Mechanisms, 7. Acid-base regulation, 8.Respiration & Pulmonary Ventilation, 9.Control of Ventilation. 10-12. Body Fluids and Kidney Function

### Laboratory/Seminar Schedule (dates TBA before start of term)

Week	Lectures	Laboratory/Seminar
1	2	NO LABS
2	2	1. Introductory Laboratory/Animal Handling Lecture
3	2	2. Exercise, Heart Rate, ECG and Peripheral Blood Flow
4	2	Seminars
5	2	3. Autonomic Control of Frog Heart
6	2	4. Vagal Tone
7	0	NO LABS (Mid-term Recess)
8	1 Midterm	NO LABS
9	2	5. Animal Respiration
10	2	NO LABS
11	2	Seminars (continued)
12	2	6. Human Kidney Function
13	2	NO LABS
14	1	NO LABS

### **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.*

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## **Course Materials**

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- **Recommended Text:** Guyton, A.C. and Hall, J.E. Textbook of Medical Physiology. 12<sup>th</sup> or 13<sup>th</sup> Edition. W.B. Saunders Co. Copies available at the Campus Store.
- **IMPORTANT:** The online version of the text is available at: <https://studentconsult.inkling.com/>
  - Search for “Guyton and Hall” and select the 13<sup>th</sup> edition. The course includes material from units III (The Heart), IV (The Circulation), V (Body Fluids and Kidneys) and VII (Respiration). Students can buy individual units rather than the whole text. Apps are available for access via smart phones etc.

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## **Course Evaluation**

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- **Marks:**
  - 25% - Midterm (50 minutes, during class, week after midterm recess)
  - 40% - Laboratories/Seminars (
    - 1 seminar – 7%
    - 2 in-lab quizzes – 6%
    - 3 lab reports – 27%
  - 35% - Final Exam (2 hours, April exam period as scheduled by the registrar). The examination is cumulative, but emphasizes material covered after the midterm test.
- **Policy on late lab reports**
  - Lab reports and seminar reports are due at 8:30 am or 2:30 pm – one week after completion of the lab i.e. at the start of the next lab (or seminar) period, unless you are told otherwise.
  - All reports must be handed in as hard copies unless otherwise instructed.
  - A McMaster Student Absence Form is required if you miss attending a lab, seminar or a report submission deadline. These are submitted using MOSAIC. Ensure you enter [mgeorg@mcmaster.ca](mailto:mgeorg@mcmaster.ca) as the contact.
  - If you do not hand in a lab report but submit an MSAF or can provide a valid reason that is approved by the Associate Dean’s Science Office, your accommodation will be a 48 hour extension from the lab report due date, regardless when the MSAF was submitted.

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## Academic Integrity

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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](https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/), located at <https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/>

The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

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## Authenticity/Plagiarism Detection

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**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](http://www.mcmaster.ca/academicintegrity).

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## Courses with an On-line Element

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**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.

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## Online Proctoring

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**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.

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## Conduct Expectations

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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.

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## Academic Accommodation of Students with Disabilities

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

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## Requests for Relief for Missed Academic Term Work

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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.

Please note that the MSAF may not be used for term work worth 25% or more. Immediately after using the online tool, students **MUST contact Mihaela Georgescu ([mgeorg@mcmaster.ca](mailto:mgeorg@mcmaster.ca))** regarding the nature of the relief. Failure to do so may negate the opportunity for relief.

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

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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.

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## Copyright and Recording

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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.

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## Extreme Circumstances

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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.