



# HK\*3810 Human Physiology II - Integrated Systems

Fall 2019  
Section(s): C01

Department of Human Health and Nutritional Sciences

Credit Weight: 0.75

Version 1.00 - August 28, 2019

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## 1 Course Details

### 1.1 Calendar Description

This course will build on the fundamental concepts and principles of communication systems developed in Human Physiology I and examine more complex physiological phenomena such as the control of blood volume and blood pressure, which integrates tissue of the cardiovascular system, the heart, vasculature and kidney, and acid-based physiology, which integrates the respiratory system and the kidney. Finally, all systems will be integrated to determine how the body responds to challenges such as altitude, exercise and shock (blood loss).

**Pre-Requisites:** HK\*2810

### 1.2 Course Description

Physiology has a foundation of concepts and ideas that are used repeatedly to explain a variety of observations. Lectures will build on the fundamental concepts and principles of communication developed in Human Physiology I and continue to build the body by putting together systems to regulate more complex physiological phenomena such as the control blood volume and blood pressure (integrating tissues of the cardiovascular system, the heart, vasculature and kidney) and acid-base physiology (integrating the respiratory system and the kidney). Finally, all of the systems will be integrated to determine how the body would respond to challenges such as altitude, exercise and shock (blood loss). The course presents the factual material and theories used to explain the function of the organs or systems so that you are able to utilize this information in explaining life situations. The majority of the material is presented in the context of feedback control systems with emphasis placed on the function of the normative cell, tissue and body.

### 1.3 Timetable

Lecture: Tues 8:30-9:50, Thurs 8:30-9:50 ROZH 101

Seminar: Fri 3:30-4:20 ROZH 101

## 1.4 Final Exam

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

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## 2 Instructional Support

### 2.1 Instructional Support Team

**Instructor:** Coral Murrant  
**Email:** cmurrant@uoguelph.ca  
**Telephone:** +1-519-824-4120 x56173  
**Office:** ANNU 354  
**Office Hours:** Tuesdays 2:00- 5:00 pm

### 2.2 Teaching Assistants

There are 2 teaching assistants (TAs) as resources for this course. TA's will be monitoring the D2L bulletin board and are available to e-mail directly with questions and set up appointments to answer questions.

TA	E-mail
Nicole Fletcher	fletchen@uoguelph.ca
Hesham Shamshoum	hshamsho@uoguelph.ca

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## 3 Learning Resources

### 3.1 Required Resources

#### Courselink (Website)

<https://www.courselink.uoguelph.ca>

The course outline, a tentative lecture schedule, readings and handouts for specific lectures can be found at the Courselink D2L site for the course. In D2L you can submit questions on the course discussion board where TAs will be monitoring daily. The discussion board will be monitored from Sept. 5th to Dec. 1st, and will not be monitored after Dec. 1st.

### 3.2 Recommended Resources

### **Textbook of Medical Physiology (Textbook)**

The recommended textbook for the course is **Textbook of Medical Physiology, 13th edition by Hall** and is available at the University bookstore. The 11th and 12th editions are also an acceptable textbook for the course. Copies of the textbook are on reserve at the library.

## **3.3 Campus Resources**

If you are concerned about any aspect of your academic program:

- make an appointment with a program counsellor in your degree program.  
<http://www.bsc.uoguelph.ca/index.shtml> or  
<https://www.uoguelph.ca/uaic/programcounsellors>

If you are struggling to succeed academically:

- There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist. <http://www.learningcommons.uoguelph.ca/>

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance. <https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. <http://www.uoguelph.ca/~ksomers/>

If you have a documented disability or think you may have a disability:

- The Centre for Students with Disabilities (CSD) can provide services and support

for students with a documented learning or physical disability. They can also provide information about how to be tested for a learning disability. For more information, including how to register with the centre please see:

<https://www.uoguelph.ca/csd/>

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## 4 Learning Outcomes

### 4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Learn the fundamentals of heart, vasculature, kidney, and lung tissue function.
2. Apply the principles and concepts learned in HK\*2810 to understand tissue function.
3. Integrate individual tissues to enable systems to work, i.e. integrate the heart, and vasculature to understand the cardiovascular system, integrate the lung and the kidney to understand the acid/base system.
4. Integrate the systems within the body to understand physiological regulation of regulated variables i.e. integrate the central nervous system with the cardiovascular system and kidney to determine how mean arterial pressure is regulated (which includes integrating principles and systems learned in HK\*2810 with systems learned in HK\*3810).
5. Integrate multiple systems to determine how whole body will respond to physiological challenges such as exercise and hemorrhage (which includes integrating all systems learned in HK\*2810 with systems learned in HK\*3810).
6. Demonstrate knowledge of the mechanistic explanations for physiological events at the cellular and tissue level and systems level.
7. Developed advanced problem solving and critical thinking skills by applying and integrating physiological principles, tissues and systems to solve physiological challenges such as left heart failure, right heart failure, systemic vasoconstriction, altitude, snorkeling, exercise, shock, etc.
8. Effectively communicate ideas and arguments in graphic and written form in assignments and tests for assessment.
9. Interpret data in tabular and graphic form in homework assignments and tests, in order to assess how the body responds to challenges.

10. Identify gaps in knowledge in the area of physiology.

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## 5 Teaching and Learning Activities

### Course Philosophy

The philosophy of this course will be to show students that physiology is built on fundamental principles that are used to build the foundations of communication, which are in turn used and integrated to build systems within the body with higher order functions. This course will take an integrated approach to building physiological systems. The course will also take a problem-solving, critical thinking approach to understanding the material and building physiological systems. Following this pedagogical style, the testing style will be short and long answer where students must work through problems and show their work. Weekly tutorial assignments will be completed in groups and used to help students with the short and long answer testing style.

### 5.1 Lecture

#### Topics:

#### Tentative lecture schedule

DATE		SECTION	LECTURE	11 <sup>th</sup> edition readings (pages)	12 <sup>th</sup> edition readings (pages)	13 <sup>th</sup> edition readings (pages)
Sept 05	Thursday	1. Heart and vasculature	The cardiovascular system			
Sept 06	Friday		Heart bioelectricity	116-124	115-122	123-133
Sept 10	Tuesday		Heart bioelectricity			
Sept 12	Thursday		Cardiac cycle	106-111	104-110	113-119

Sept 13	Friday		Problem solving - practice			
Sept 17	Tuesday		Cardiac output	111-114, 232-236, 237-243	110-112, 229-232, 233-240	119-121  245-256
Sept 19	Thursday		Vasculature and flow	161-170, 204-208, 750-755	157-166, 201-205, 731-735	169-178,  215-219,  775-779
Sept 20	Friday		Problem solving – graded (5%)			
Sept 24	Tuesday		Arterioles, Radius and TPR	195-203	191-200	203-213
Sept 26	Thursday		Capillaries	181-194 302-306	177-189 296-300	189-201  316-320
Sept 27	Friday		Problem solving – graded (10%)			
Oct 01	Tuesday		Cardiovascular mechanics	204-213	201-209	215-223
Oct 03	Thursday		Cardiovascular mechanics			
Oct 04	Friday		Sensors	204-213	201-209	215-223

Oct 08	Tuesday	2. Kidney	Structure	308-325	303-321	323-345
Oct 10	Thursday		TEST 1 (20%)			
Oct 11	Friday		Tubular function	327-342	323-337	347-362
Oct 15	Tuesday		Fall Study Break - No class			
Oct 17	Thursday		Countercurrent	348-357	345-353	371-380
			Extracellular volume	358-363	355-360	381-386
Oct 18	Friday		Regulation	342-343, 362-363, 365-381, 927-929, 947-950	337-339, 358-359, 361-377, 904-925, 924-928	362-365, 384-385, 389-406, 948-972
Oct 22	Tuesday		Regulation	216-231	213-228	227-243
Oct 24	Thursday		Regulation			
Oct 25	Friday		Problem solving – graded (5%)			
Oct 29	Tuesday	<b>3. Blood gas concentrations</b>	Pulmonary mechanics	471-481	465-475	497-507
Oct 31	Thursday		Pulmonary	483-489	477-483	509-516

			circulation			
Nov 01	Friday		Problem solving – graded (10%)			
Nov 05	Tuesday		VA/Q and exchange	499-501 491-499, 502-512	492-494 485-492, 495-504	524-526, 517-524, 527-536
Nov 07	Thursday		O <sub>2</sub> and CO <sub>2</sub> sensors			
Nov 08	Friday		Regulation of blood gases	514-523	505-513	539-548
Nov 12	Tuesday	4.Integration	Acid/base physiology	383-400	379-395	409-426
Nov 14	Thursday		TEST 2 (20%)			
Nov 15	Friday		Acid/base physiology			
Nov 19	Tuesday		Acid/base physiology			
Nov 21	Thursday		Chronic hypoxia/altitude	537-541	527-531	561-565
Nov 22	Friday		Exercise	1055-1066	1031-1039	1085-1093
Nov 26	Tuesday		Cardiovascular shock			



Nov 28	Thursday		Cardiovascular shock			
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## 6 Assessments

### 6.1 Assessment

Form of assessment	Weight of assessment	Date of assessment	Course content	Learning outcome addressed
Group problem solving	5%	Sept-20	Practice problem solving and critical thinking: Heart and vasculature	1-10
Group problem solving	10%	Sept-27	Practice problem solving and critical thinking: Heart and vasculature	1-10
Test 1	20%	Oct-10	1. Heart and vasculature	1-9
Group problem solving	5%	Oct-25	Practice problem solving and critical thinking: Kidney	1-10
Group problem solving	10%	Nov-01	Practice problem solving and critical thinking: Blood gasses	1-10
Test 2	20%	Nov-14	2. Kidney and 3. Blood gasses	1-9
Test 3	30%	TBA - In final exam schedule	4. Integration	1-9

## 6.2 Note

Graded group problem solving will be completed in the lecture time in groups of 4 and will be short and long answer format. If a graded group problem solving assignment is not written then the weighting of the assignment will be added to the weighting of the next midterm. The midterm and final exam will consist of short and long answer test questions. For graded group problem solving assignment, any assignment grade that is lower than your midterm grade will be dropped and the weighting of the dropped assignment will be added to the weighting of your midterm.

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## 7 Course Statements

### 7.1 Grading

Tests 1 and 2 will be written in class time. Test 3 will be written during the final exam schedule at a time and location assigned by the Registrar.

As tests will be written in class time, there will be no alternate times to write test 1 or test 2. If you are unable to write test 1 or 2 due to illness or compassionate reasons the weighting (%) of these tests will be added to the weighting (%) of the final exam.

### 7.2 Technology in the classroom

Feel free to bring your laptop to lectures, but only use it in a manner that will not disturb those around you. Please do not use your laptop for anything other than activities related to this physiology course. Turn your cell phones off, or put them on silent, and do not text-message during class.

## 8 Department of Human Health and Nutritional Sciences Statements

### 8.1 Academic Advisors

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

### 8.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist. <http://www.learningcommons.uoguelph.ca/>
- Science Commons: Located in the library, the Science Commons provides support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

### 8.3 Wellness

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance. <https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. <http://www.selfregulationskills.ca/>

## 9 University Statements

### 9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

### 9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

### **9.3 Drop Date**

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

### **9.4 Copies of Out-of-class Assignments**

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

### **9.5 Accessibility**

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

More information can be found on the SAS website

<https://www.uoguelph.ca/sas>

### **9.6 Academic Integrity**

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

## **9.7 Recording of Materials**

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

## **9.8 Resources**

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

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