

## BIOC34: Human Physiology II Lecture (2021)

**Description:** This course will cover the cardiovascular, respiratory, renal and digestive systems as well as acid-base balance and some sleep physiology.

### Lecture Schedule

Please note that on the UTSC timetable this course is listed as being a synchronous course.

In this course, “synchronous” means that the exams are being held at a specific time that requires your on-line presence to do the exam at that specific time.

The lectures are NOT synchronous. There is nothing special about the 10-11 (Monday and Wednesday) times listed on the timetable. There is nothing that you need to be on-line for at that time. The lecture videos have been uploaded to the Media Gallery page on the course Quercus site. They will be available at all times all semester.

Week	Lec.#	Lecture Topic
1	1	(CV) Electrical Activity of the Heart
	2	(CV) Electrocardiogram (ECG)
2	3	(CV) ECG; The Electrical Axis of the Heart; The Cardiac Cycle
	4	(CV) The Cardiac Cycle; Regulation of Cardiac Output (heart rate)
3	5	(CV) Regulation of Cardiac Output (stroke volume) and Cardiac P-V Loops
	6	(CV) Regulation of Cardiac Output (stroke volume continued)
4	7	(CV) Heart Failure and Blood Flow Regulation
	8	(CV) Blood Flow and Blood Pressure Regulation
5	9	(CV; Resp) Blood Pressure Regulation and Pulmonary Mechanics
	10	(Resp) Pulmonary Mechanics
6	11	(Resp) Spirometry; Lung Volumes and Capacities; Alveolar Ventilation;
	12	(Resp) Blood Gas (O <sub>2</sub> and CO <sub>2</sub> ) Transport
7	13	(Resp) Blood Gas Transport; Ventilation-Perfusion Ratios
	14	(Resp) Control of Breathing
8	15	(Resp) Sleep and Sleep-Related Breathing Disorders
	16	(Renal) Kidney Function: Glomerular Filtration
9	17	(Renal) Reabsorption, Secretion and Excretion; Na <sup>+</sup> and K <sup>+</sup> Regulation
	18	(Renal) Calcium and Glucose Regulation; Clearance
10	19	(Renal) Medullary Osmotic Gradient; Urine Production; Acid-base Balance
	20	(Renal and respiratory) Acid-base Balance
11	21	(GI) Salivary Glands; The Esophagus; Stomach Function
	22	(GI) The Intestine; The Pancreas; Diabetes; The Liver
12	23	(GI) Liver Function; Biliary System; Nutrient Digestion
	24	(GI) Neural and Hormonal Regulation of Digestion

Note: Some topics may carry over from one lecture to the next.

CV, Cardiovascular Physiology; Resp, Respiratory Physiology; Renal, Renal Physiology; GI, Gastrointestinal (Digestive) Physiology

**Instructor:** Dr. Stephen Reid; e-mail, [stephen.reid@utoronto.ca](mailto:stephen.reid@utoronto.ca)

**Office hours:** As of now I am not planning on setting specific office hours for this semester. Students may contact me via e-mail at any time to ask questions and, if necessary, make arrangements for a phone call to discuss any issues that arise. I may look to change this if there is a need to do so.

**Questions Via E-Mail:** I will be happy to answer questions via e-mail.

**Teaching Assistants:** The primary duty of the teaching assistants in this course is to mark assignments. Please contact Dr. Reid ([stephen.reid@utoronto.ca](mailto:stephen.reid@utoronto.ca)) for all course related matters (content questions and otherwise).

**Textbook:** There is no required textbook for this course. I will provide detailed notes to accompany each of the lectures. These are available on the course web site.

During the initial years of this course, many students found that the textbook was not necessary as long as they attended the lectures. Most of the standard human physiology textbooks on the market are suitable for this course with the exception of a couple that are not detailed enough. If you have a book that was (is) used in another human physiology course at another university, it is likely to be suitable for this course.

1. "Human Physiology" by D.U. Silverthorn
2. "Human Physiology" by R. Rhodes and R. Pflanzer
3. "Principles of Human Physiology" by W.J. German and C.L. Stanfield
4. "Principles of Human Physiology" by C.L. Stanfield

**Lecture Slides:** All Power Point slides will be posted in advance of the lectures.

**Lecture Notes:** Notes to accompany each lecture will be posted in advance of the lectures.

**Sample Questions/Study Guides:** Sample exam questions from previous years are available on the course web site.

## **Evaluation**

**Midterm Exam**, 35% (covers lectures 1-12; date to be announced)

**5 Informal Simulated Laboratory Reports**, (5 X 4% = 20%; see below)

**Final Exam**, 45% (cumulative, covers lectures 1-24; during the final exam period)

The midterm exam will cover lectures 1-12. The midterm exam schedule is usually not announced until the third week of the semester. I will announce the date once the Scheduling Office releases the term test schedule.

Given that Reading Week falls after the fifth week of classes rather than after the sixth week of classes, the content of the midterm exam (in terms of lectures covered) may be adjusted if an adjustment is required to account for the abnormally-early reading week and/or an oddly-scheduled midterm exam.

The midterm exam will consist of 60 – 70 multiple choice questions and will be 2 hours in length.

A **make-up midterm exam** will be scheduled for those students who miss the midterm exam for a legitimate reason. Announcements will be made on the course web site.

The final exam is cumulative. It will cover lectures 1-24. It will be three-hours long and will consist of 100 multiple choice questions.

If your mark on the final exam is greater than your mark on the midterm exam, then the mid-term mark will be discarded and final exam mark will count in its place. **However, you must write the midterm exam for this policy to apply or have a valid excuse for missing the initial exam and the make-up exam.** This shouldn't be taken as a reason to dismiss the mid-term exam as being unimportant.

**All exams will consist of multiple choice questions. The final exam is cumulative.**

### **BIOC90; Integrative Multimedia Documentary Project**

For those students who declare that the BIOC90 grade will be incorporated into the BIOC34 grade, the final course grade in BIOC34 will be converted to a mark out of 90% and the 10% associated with BIOC90 will be added to this to achieve the final course grade. Questions regarding BIOC90 should be directed to the instructor for that course.

Please note that you **MUST** follow MY instructions when submitting your lab report. You will submit the data from the PhysioEx experiments plus the answers to questions that I PROVIDE. These are not the questions that are embedded within the PhysioEx labs. This will become clearer when you look at the PhysioEx labs once they are available.

The penalty for submitting unwanted material from the PhysioEx labs will be waived for the first assignment. From then on the penalty will grow in 25% increments for assignments 2-5. This is necessary to encourage the instructions to be followed and to prevent students from submitting 30-50 pages in their report when you are only required to submit around 2-4 pages (depending upon the assignment).

## **Computer Simulated Laboratory Exercises**

We will be using the PhysioEx Laboratory Simulations in Physiology software to complete five (5) laboratory exercises. Over the last year this software has been changed from Flash-based to html-based and has migrated to a new platform on the publisher's web site.

In order to access this software you will need to purchase a code from the bookstore and then register on the software site.

Instructions will be provided on how to access this software and on what is required for the lab report. Submissions will be via Quercus.

The five (5) labs that you will be doing are:

### Cardiovascular Physiology

Lab 5; Cardiovascular Dynamics

Lab 6; Cardiovascular Physiology

### Respiratory Physiology

Lab 7; Respiratory System Mechanics

### Renal Physiology

Lab 9; Renal System Physiology

### Acid-Base Balance

Lab 10; Acid-Base Balance

### **You will be required to submit five informal laboratory reports:**

- 1) **Lab 6**, Cardiovascular Physiology; Due Friday, February 5<sup>th</sup>
- 2) Lab 5, Cardiovascular Dynamics, Due Monday, February 22<sup>nd</sup>
- 3) Lab 7, Respiratory System Mechanics, Due Friday, March 12<sup>th</sup>
- 4) Lab 9, Renal System Physiology, Due Wednesday March 26<sup>th</sup>
- 5) Lab 10, Acid-Base Balance, Due Monday, April 5<sup>th</sup>

### **Note that PhysioEx lab 6 is the first assignment and PhysioEx lab 5 is the second assignment.**

Note that the due dates have been selected so that there is plenty of time to complete the assignments after the associated topic has been covered in the lecture.

The due dates may be delayed to accommodate the midterm exam and for any other reason that may arise. I will make announcements in this case.

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