

BIOC34: Human Physiology II Lecture (2019)

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

Lecture Schedule

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 ₂ and CO ₂) 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 ⁺ and K ⁺ 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; Office, S526; e-mail, sgreid@utsc.utoronto.ca

Office hours: Monday and Wednesday, 11:15 to 12:30 or by appointment (e-mail for an appointment). Additional office hours on Tuesday, Thursday and Friday will be announced at the beginning of February and will remain in effect for the rest of the semester.

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. They will be available to return assignments and answer questions about the assignments at regular intervals during the semester. Please contact Dr. Reid (sgreid@utsc.utoronto.ca) for all course related matters (content questions and otherwise).

Pre-Requisites: BIOB30 or BIOB34 or NROB60 or BIO271

Lecture Times: Monday, 10-11AM (AA112) and Wednesday, 10-11AM (AA112)

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.

Over the past years, 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. Pflanzner
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 will be 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. In the unlikely event that the midterm exam is scheduled prior to reading week then the content of the midterm exam will be adjusted accordingly. The midterm exam will consist of 60 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. I usually wait until after the exam to see how many students missed it before I book a room for the make-up.

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.** 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.

Computer Simulated Laboratory Exercises

Required Lab Book and Software

PhysioEx. Laboratory Simulations in Physiology (available in the bookstore). The PhysioEx package can be purchased in two formats: 1) A physical book that also comes with a code to allow you to access the labs on the PhysioEx web site. 2) A code only that allows you to access the simulated labs on the PhysioEx web site. Please see the cashier at the bookstore for this second option.

The PhysioEx software package contains 11 simulated laboratory exercises. The following exercises are relevant to this course

Cardiovascular Physiology

Lab 5; Cardiovascular Dynamics

Lab 6; Cardiovascular Physiology

Respiratory Physiology

Lab 7; Respiratory System Mechanics

Lab 10; Acid-Base Balance

Renal Physiology

Lab 1; Cell Transport Mechanisms and Permeability

Lab 9; Renal System Physiology

Lab 10; Acid-Base Balance

Digestive Physiology

Lab 8; Chemical and Physical Processes of Digestion

You will be required to submit five informal laboratory reports:

- 1) **Lab 6**, Cardiovascular Physiology; Due Friday, February 1
- 2) **Lab 5**, Cardiovascular Dynamics, Due Friday, February 15
- 3) **Lab 7**, Respiratory System Mechanics, Due Friday, March 8
- 4) **Lab 9**, Renal System Physiology, Due Friday March 22
- 5) **Lab 10**, Acid-Base Balance, Due Thursday, April 4

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.

Instructions on the format of the report are posted in the assignments folder on the course web site.

- Reports are due by 4 PM on the due date mentioned above. They can also be submitted prior to the due date (for those who are not necessarily on campus on the due date).
- Electronic versions sent as e-mail attachments will not be accepted (unless warranted by exceptional circumstances). Please contact me if your circumstances prevent you from being on campus regularly and would like to submit electronically.
- Late reports will be penalised minus 25% per day late.
- Submit reports to S526. There will be drop-boxes for the reports on the wall in the corridor and on the table in the outer office. Reports can also be pushed under the door if it is closed and the wall-mounted drop box is full.

Note that the final assignment is due on a Thursday (April 4). Assignments can always be submitted in advance of the due date if you are not on campus on the due dates.