

University of Toronto Scarborough – Department of Biological Sciences

## **BIOC33 – Human Physiology II: Lecture and Laboratory – Winter 2016**

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**Course Description:** This course will cover the physiology of the human respiratory, cardiovascular, renal and digestive systems. Topics include cardiac function, ECG, blood flow/pressure regulation, pulmonary mechanics, gas transfer and transport, the control of breathing, sleep-related breathing disorders, kidney function, ion regulation, water balance, acid-base balance and digestive function/regulation.

**Prerequisites:** BIOB34H3 or (BIOB30H3) or NROB60H3

**Exclusions:** BIOC34H3, (BGYC33H3), (BGYC34H3), PSL201Y, PSL301H, (PSL302Y)

### **Lectures:**

Mondays and Wednesdays 10:10-11am, HW216

\*\*Lectures will be available via Weboption Lecturecasts for the entire semester

Lecture notes will be posted (in PowerPoint format only) on Blackboard ~24 hours before each lecture. **NOTE: I do reserve the right to make changes to the lecture notes after they are posted.**

Each week, an *optional* quiz (here *optional* means not worth any marks) will be posted on Blackboard. These quizzes will allow students to i) assess their understanding of the lecture content, ii) think critically and creatively about lecture content, as well as apply lecture content to novel situations and problems, and iii) prepare for the Term Tests and Final Exam. Students are strongly encouraged to discuss these quizzes with the course instructor when they encounter any difficulties, either by email or during office hours (preferred).

## **Textbook:**

I do not “teach from a textbook”. There will be no assigned readings from any textbook, and only material covered in class will be subject to examination; however, in my experience, many students enjoy having a textbook to supplement their lecture notes. If you so desire, I would recommend the following textbook, which is available in the campus bookstore:

*Human Physiology: An Integrated Approach*, 7<sup>th</sup> ed., Silverthorn

I will post suggested readings, where applicable, from this textbook on Blackboard; however, this textbook may discuss material not covered in lecture, and I may discuss material in class not covered by the textbook. **You are responsible for all material covered in class only.**

## **Laboratories:**

All laboratory sessions are held in SW242. Students are expected to attend all laboratory sessions, as there will be material from all laboratory sessions on the Laboratory Exam; however, **students must attend only the laboratory session in which they are registered as, for legal and safety reasons, there are limits to the number of students that each laboratory session can accommodate. Students attempting to attend a laboratory session for which they are not registered will be denied entry.** Students who arrive to their laboratory session late may be denied entry into the laboratory session at the discretion of the teaching assistant.

The procedure for each laboratory exercise will be posted on Blackboard about one week prior the laboratory session in which it is to be completed; therefore, there is no laboratory manual to purchase for this course.

By law, students are required to wear a lab coat and closed-toed shoes whenever they are in the laboratory. Moreover, no food or drink is permitted in the laboratory at any time. **If students violate any of these requirements, the teaching assistant will rescind their entry into the laboratory.**

Before leaving each laboratory session, students must “check-in” with their teaching assistant, at which time the teaching assistant will review the student’s completion of the laboratory exercise and the student’s attendance at the laboratory session will be noted. *Attendance is being taken solely for the purpose of ensuring that students do not submit laboratory reports for labs that they did not attend.*

## **Evaluation:**

Term Tests	35%	(23% best; 12% worst)
Laboratory Assignments	20%	(4 x 5% each)
Laboratory Exam	10%	
Final Exam	35%	

## Important Notes Regarding Evaluations:

### Term Tests

There are two Term Tests in this course. The dates and times of the Term Tests will be determined by the Registrar's office during the first few weeks of the semester, and I will post this information on Blackboard as soon as it is available. The Term Tests are not cumulative. The lectures covered on each Term Test will be announced in class and on Blackboard. Term Tests will be 2 hours and will comprise of multiple choice questions only. Students will have some choice with regards to which questions they answer (e.g., answer 20 out of 25 multiple choice questions). **A large proportion (about 70%) of the Term Test questions will require students to think critically and creatively about the lecture content as well as apply the lecture content to novel situations and problems.** The optional online quizzes will help students to prepare themselves to tackle such questions successfully. Additional office hours (either in-person or online via Blackboard Collaborate) may be made available during the week prior to the Term Tests.

If you know *in advance* that you cannot write a Term Test at the scheduled time because it conflicts with some other valid activity, please notify me as soon as possible so that we can make arrangements for you to write the Term Test at an alternative time.

If you miss a Term Test due to medical illness, then you must submit a detailed UTSC Medical Certificate filled out by the physician who saw you on the day of the Term Test. This note must be submitted to the course instructor as soon as possible following the Term Test, whether in person or via email. Other medical notes will not be accepted, and if the UTSC Medical Certificate is not completed to the satisfaction of the course instructor, it may be refused. The UTSC Medical Certificate can be found via the following link:

[http://www.utsc.utoronto.ca/~registrar/resources/pdf\\_general/UTSCmedicalcertificate.pdf](http://www.utsc.utoronto.ca/~registrar/resources/pdf_general/UTSCmedicalcertificate.pdf).

If you miss a Term Test for any other valid reason, please consult with the course instructor as soon as possible. The course instructor will determine whether the reason given for a missed Term Test is valid in accordance with university policies. Also, the course instructor may ask for any documentation required to verify the reason given.

Students who miss one Term Test for a valid reason (medical or otherwise) will not be permitted to write a make-up Term Test; rather, the weight of the remaining Term Test will be increased to 35% of their final grade. Students who miss both Term Tests for valid reasons will not be permitted to write make-up Term Tests; rather, the weight of their Final Exam will be increased to 65% and they will be asked to submit an additional written assignment worth 5%, which will be due no later than the last day of classes. **Under no circumstances will the weight of a missed Term Test be transferred to the Final Exam, so please do not ask.**

Students who miss a Term Test for any invalid reason will receive a grade of zero for that Term Test.

## Laboratory Assignments

Over the course of the semester, students will complete four (**and no more than four**) laboratory assignments, one of each of the following types:

1) **Report & Explain.** For this assignment, students will present the results of their laboratory exercise in proper graphical and/or tabular form. They will also describe and interpret their results with text. (Essentially, students are writing a traditional “Results & Discussion” section.) The graphs and tables presented, as well as any references used, should meet the “Guidelines for Manuscript Preparation” from the *Journal of Experimental Biology* (sections 3.3.3, 3.4, 4.1, and 4.2.1), which can be found at <http://jeb.biologists.org/content/manuscript-prep>. Word limit (all text, including table titles and figure legends) = 1250 words.

2) **Reflect & Evaluate.** For this assignment, students will assess the pedagogical value of the laboratory session that they have completed and make associated recommendations about changes to the structure of the laboratory session. In making recommendations, students must consider and address the feasibility of their recommendations with regards to time, space, and financial constraints. Word limit = 750 words.

3) **Plan & Design.** For this assignment, students will outline a new laboratory exercise/experiment that could be completed by future BIO33 students that follows up on a current laboratory exercise/experiment conducted in the laboratory session, where “follows up” means that the new laboratory exercise/experiment addresses questions that were raised or left unanswered by the current laboratory exercise/experiment. (Essentially, students are writing an “Introduction & Methods” section for a new laboratory experiment that they have designed.) Word limit = 1000 words.

4) **Using Instruments & Teaching.** For this assignment, students will create a video tutorial for a Grade 5 teacher who is seeking to perform an experiment in his/her classroom similar to the one performed by the student in the laboratory session. Students should assume that the teacher has limited science training but does have a small budget available for the purchase of equipment. Moreover, students must consider the science learning expectations for Grade 5 Ontario students as outlined in the curriculum, which can be found at <http://www.edu.gov.on.ca/eng/curriculum/elementary/grade5.html>, and incorporate these learning expectations into the video tutorial. The video must be in .mp4 format and cannot be longer than 10 minutes.

Each student can decide for themselves whether to submit a laboratory assignment following a given laboratory session, and which type of laboratory assignment to submit. **All laboratory assignments are due exactly two weeks after the completion of the laboratory session that corresponds to the laboratory assignment being submitted.** (*NOTE: For the purposes of this rule, Reading Week does not count as a week.*) Late submissions will not be accepted under any circumstances. Students may only submit a laboratory assignment for a laboratory session that they attended. Students may complete laboratory assignments alone or with a partner. *Students can only submit one type of laboratory assignment for any particular laboratory session.*

All laboratory assignments are submitted and evaluated via Blackboard. Student should attach the file to be submitted. For students working in partners, only one student should submit the

assignment but should indicate the name and student number of their partner in the Comments section on the submission page.

Laboratory assignments will be evaluated by the teaching assistants as follows:

a) **Accepted. 10/10.** No feedback from the TAs will be provided, and no further action is required.

b) **Accepted but Revisions Necessary. 7/10.** In this case, students have two options: i) They can do nothing and keep the grade received, or ii) they can submit a revised copy of their laboratory assignment using the feedback provided by the teaching assistant to make their revisions. **Such revised laboratory assignments are due within one week of receiving the evaluation from the teaching assistant, and any revisions made must be shown using the Track Changes feature available in most word processing software, where applicable.** If their revised laboratory assignment is accepted following revisions, students will receive 10/10; if it is not, students will receive 7/10. **In this latter case, students are not permitted to submit any additional laboratory assignments to try to improve their grade.**

c) **Rejected. 0/10.** In this case, students will be provided with feedback from the teaching assistant, but students will not be permitted to revise their laboratory assignment, and it will be considered as if no laboratory assignment were submitted at all. **Students will, therefore, have the opportunity to submit another laboratory assignment in a following week.**

### **Laboratory Exam**

During the final laboratory session, students will write a Laboratory Exam, which is worth 10% of their final grade. The exam will be 1.5 hours long and will comprise of short answer questions. *Students will be required to answer questions pertaining to all laboratory sessions in the course.* The questions will assess the student's familiarity with/understanding of the equipment and procedures used in the laboratory. In this way, it will be a "practical" exam.

If you know ***in advance*** that you cannot write the Laboratory Exam at the scheduled time because it conflicts with some other ***valid activity***, please notify me as soon as possible so that we can make arrangements for you to write the Laboratory Exam at an alternative time. If you miss the Laboratory Exam due to medical illness or for some other valid reason, please provide the appropriate documentation (see Term Tests above) as soon as possible and we will make arrangements for you to write the Laboratory Exam at an alternative time. **Under no circumstances will the weight of the Laboratory Exam be transferred to any other part of this course, so please do not ask.**

### **Final Exam**

The Final Exam (3 hours) will be scheduled by the Registrar's office (April 8-22) and will be worth 35% of the final grade. The Final Exam will cover all material covered in the lectures throughout the course, though it will place emphasis on the material covered since the last Term Test. It will have the same format as the Term Tests.

**Tentative Schedule:**

<b>WEEK</b>	<b>MONDAY LECTURE</b>	<b>WEDNESDAY LECTURE</b>	<b>LABORATORY EXPERIMENT</b>
Jan 4	Introduction to the Course	Blood	NO LAB
Jan 11	Cardiovascular Physiology: Heart		BIOPAC Tutorial; EMG 1; EMG 2
Jan 18	Cardiovascular Physiology: Blood Vessels		ECG 1; ECG 2
Jan 25	Respiratory Physiology: Pulmonary Ventilation		Cardiovascular Physiology Computer Simulations
Feb 1	Respiratory Physiology: Gas Exchange		Blood Pressure
Feb 8	Respiratory Physiology: Gas Transport		ECG and Pulse; Respiratory Cycle 1
Feb 15	FAMILY DAY & READING WEEK – NO CLASS		
Feb 22	Respiratory Physiology: Regulation of Breathing		Pulmonary Function 1; Pulmonary Function 2
Feb 29	Fluid, Electrolyte, and Acid-Base Balance		EEG 1; EEG 2
Mar 7	Renal Physiology: Glomerular Filtration	Renal Physiology: Tubular Reabsorption and Secretion	Aerobic Exercise Physiology
Mar 14	Renal Physiology: Regulation of Urine Concentration and Volume	Renal Physiology: Urine Transport, Storage, and Elimination	GSR and Polygraph
Mar 21	Digestive Physiology: Nutrient Digestion and Absorption		Kidney Function and Acid-Base Balance Computer Simulations
Mar 28	Digestive Physiology: Endocrine Regulation of Body Mass		Laboratory Examination (takes place in lab)
Apr 4	NO CLASS – This is a UTSC Friday	NO CLASS – Classes end Apr 4	NO LAB – Classes end Apr 4

## Accessibility Needs:

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services Office as soon as possible. I will work with you and AccessAbility Services to ensure you can achieve your learning goals in this course. Enquiries are confidential. The UTSC AccessAbility Services staff (located in SW302) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (416) 287-7560 or [ability@utsc.utoronto.ca](mailto:ability@utsc.utoronto.ca).

## Academic Integrity:

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's *Code of Behaviour on Academic Matters* (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

- In papers and assignments:*
- using someone else's ideas or words without appropriate acknowledgement
  - submitting your own work in more than one course without the permission of the instructor
  - making up sources or facts
  - obtaining or providing unauthorized assistance on any assignment.
- On tests and exams:*
- using or possessing unauthorized aids;
  - looking at someone else's answers during an exam or test
  - misrepresenting your identity
- In academic work:*
- falsifying institutional documents or grades
  - falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. There are other offences covered under the Code, but these are the most common. ***Please respect these rules and the values that they protect.***