

# RESPIRATORY, RENAL & CARDIOVASCULAR PHYSIOLOGY

PHGY 312

## Winter 2017 COURSE SCHEDULE

**Lecturers:** Dr. John Hanrahan (coordinator), Room 1016A, McIntyre building, 514-398-8320, [john.hanrahan@mcgill.ca](mailto:john.hanrahan@mcgill.ca)  
 Dr. Jacopo Mortola, Room 1121, McIntyre building, [jacopo.mortola@mcgill.ca](mailto:jacopo.mortola@mcgill.ca)  
 Dr. Sheldon Magder, Royal Victoria Hospital, Room L3.05, 514-843-1664, [sheldon.magder@muhc.mcgill.ca](mailto:sheldon.magder@muhc.mcgill.ca)  
 Dr. Alvin Shrier, Room 170, Bellini Building, 514-398-2272, [alvin.shrier@mcgill.ca](mailto:alvin.shrier@mcgill.ca)  
**Location:** Stewart Biology Room S1/3 Monday-Wednesday-Friday 9:35am-10:25am

Date	Day	Lecture Title	Lecture	Lecturer
Jan. 4	W	Transmembrane potentials; resting potential; slow and fast action potentials	1	A.S.
6	F	Ionic channels; activation, inactivation, pharmacology, voltage dependence, current-voltage relations	2	A.S.
9	M	Overview of circulation; Basic principles: Pressure-flow & Pressure-volume relationships: structure of the circulation	3	S.M.
11	W	The heart as a pump. Basis of cardiac function curve (Starling's Law) and the cardiac pressure-volume relationship.	4	S.M.
13	F	Principle of venous return and bathtub concept. Stressed and unstressed vascular volume <b>Sign up on myCourses for oral presentation (by professor) starting at 11:00am</b>	5	S.M.
16	M	Integration of cardiac and return function and the control of cardiac output.	6	S.M.
18	W	Control of circulation: baroreceptor reflex, myogenic response, flow-mediated response; metabolic response. The problem of standing up.	7	S.M.
20	F	Special circulations including the coronary, cerebral and pulmonary circulations. Integrated cardiovascular responses including valsalva maneuver, and tilt. <b>Topics for oral presentation on myCourses (for review only)</b>	8	S.M.
23	M	Automaticity: pacemaker mechanism, controls, dynamics; conduction: sequence, local current flow	9	A.S.
25	W	ECG: and cardiac arrhythmias <b>Sign up on myCourses for individual presentation topic starting at 11:00am</b>	10	A.S.
27	F	EC coupling; mechanics;	11	A.S.
30	M	<b>Cardio Tutorial</b>	12	A.S./S.M.
Feb. 1	W	Functional Microanatomy of the Kidney		J.H.
3	F	Glomerular Filtration (GFR) and the clearance concept	13	J.H.
6	M	Renal Plasma flow and regulation of blood flow	14	J.H.
8	W	<b>TEST #1 –Cardio (No class) – 7:30pm-9:00pm, Palmer Howard Room 522 (McIntyre Bldg.) Please bring your I.D cards to the exam</b>		
10	F	Membrane mechanisms and epithelial transport. Diffusion, permeability.	15	J.H.
13	M	Active transport. Features unique to epithelial cells. Renal handling of organic solutes I (glucose).	16	J.H.
15	W	Renal handling of organic solutes II. Transport of amino acids, urea, creatinine, PAH, urate and proteins.	17	J.H.

<b>Date</b>		<b>Lecture Title</b>	<b>Lecture</b>	<b>Lecturer</b>
17	F	Sodium and chloride transport I. Late proximal tubule, loop of Henle	18	J.H.
20	M	Sodium and chloride transport II. Distal tubule & cortical collecting duct. Water transport and aquaporins. Intro to the renal concentrating mechanism	19	J.H.
22	W	Renal concentrating mechanism. Efficiency and control, role of urea, diuretics, intracellular osmolytes	20	J.H.
24	F	Acid-Base Balance	21	J.H.
<b>Feb 27 – Mar 3</b>		<b>READING WEEK</b>		
Mar 6	M	Potassium homeostasis and the renal excretion of potassium	22	J.H.
8	W	Control of Body Water and NaCl balance	23	J.H.
10	F	<b>Renal Tutorial</b>		J.H.
13	M	Needs for Oxygen	24	J.M
15	W	<b>TEST #2 – Renal (No class) – 7:30pm-9:00pm, Palmer Howard Room 522 (McIntyre Bldg.) Please bring your I.D cards to the exam</b>		
17	F	The functional design of the respiratory pump	25	J.M.
20	M	Lung expansion	26	J.M
22	W	Breathing in and out	27	J.M
24	F	Distribution of the inspired air	28	J.M
27	M	Gases in the body	29	J.M
29	W	Neural regulation	30	J.M
31	F	The VE response to hypoxia	31	J.M
April 3	M	High altitude	32	J.M
5	W	Temperature and breathing	33	J.M
7	F	Muscle exercise	28	J.M
10	M	Perinatal respiration	29	J.M

**"Discussions on Respiration": April 7th (Fri), April 10th (Mon), 3:30 pm- 5:00 pm Room 1019**

**\*\* Students are responsible for checking *MyCourses* for course notes/slides and any updates\*\***

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**EVALUATION**

**1. Class Tests – (20% each)**

There are 2 class tests. The first class test is on **Wednesday, February 8th at 7:30pm-9:00pm, Palmer Howard Room 522 (McIntyre Bldg.)** and will cover the **Cardio** section of the course. The second class test is on **Wednesday, March 15th at 7:30pm-9:00pm, Palmer Howard Room 522 (McIntyre Bldg.)** and will cover the **Renal** section of the course. Class tests are usually, but not always, multiple-choice type questions and may have a component that is short answer or essay. Please note that multiple versions of exams will be administered in order to reduce any temptation for copying a more "correct" answer. Once the tests have been graded, an **Exam Viewing** will be scheduled.

**Medical Notes**

Students who miss a test due to a medical or other acceptable reason must provide a note to the Course Secretary (McIntyre, Room 1021) **within two weeks of the missed test**. The value of the final exam will then be increased proportionally. A mark of zero will be given to students with no note. There are no makeup tests.

**2. Assignment (Oral presentation)– (20%)**

Sign up on **myCourses** on **Friday, January 13 starting at 11:00am** on one of the professor's section that interests you (Renal: Dr. Hanrahan, Cardio: Drs. Shrier & Magder, Respiration: Dr. Mortola) (spaces are limited). Once you have secured your spot for that professor's assignment that interests you, you will **then sign up for the individual topic on Wednesday, January 25 starting at 11:00am on myCourses**. (One topic per students). Instructions on the sign-up will be posted on *myCourses*. The assignments will consist of an oral presentation (i.e.: presenting a scientific paper to the professor and a small group of students. The presentation dates will be available at the end of January/early February and you will have to sign up again on *myCourses*. Please keep checking *my courses* for the date and time of this sign up.

- a) The oral presentations for the **Cardio** section will be from **March 9– March 17**
- b) The oral presentations for the **Renal** section will be from **March 14– March 23**
- c) The oral presentations for the **Respiratory** section will be from **March 20– March 31**

**\*\*All assignments are of similar difficulty and grades will be normalized (up or down) so that they are fair and comparable for each section\*\***

**3. Final Exam – (40%)**

The Final exam is usually but not always "multiple choice" type questions and may have a component that is short answer or essay. All three sections of the course will be covered, with more emphasis on the last section, so that all three sections are evaluated equally. Please note that multiple versions of exams will be administered in order to reduce any temptation for copying a more "correct" answer. **Supplemental/Deferred** and **Religious Conflict** exams will differ from the final exam. They may consist of multiple choice, short answer or only essay type questions.

## MARKING SCHEME

In summary, the 2 class tests count for 20% each; the oral assignment counts for 20%; and the final exam is worth 40%, totaling 100% of the final grade.

## Grading

The Department of Physiology will **NOT** revise/upgrade marks except on sound academic grounds. Once computed, the marks in this course will **NOT** be altered/increased arbitrarily. These marks are **FINAL and NON-negotiable**

## CONTACT INFORMATION

Professors may arrange special tutorials and/or office meetings with students who require more specific directions for the assignment and/or class tests.

## TUTORIAL SERVICE

Student Services provides an additional tutorial service: Brown Building, Suite 4200, 398-6011.

## COURSE EVALUATIONS

Course evaluations will be available through Minerva at the end of term.

## SUPPLEMENTARY REFERENCES

### Renal

Widmaier, Eric P., et al. Vander's Human Physiology, 12th e. McGraw-Hill Inc. 2011.

Boron, Walter F., Emile L. Boulpaep. Medical Physiology. 2nd ed. W.B. Saunders Company. 2008.

Rose, Burton.D. Clinical Physiology of Acid-Base and Electrolyte Disorders, 5th e. New York: McGraw-Hill Inc. 2001.

Koeppen, B. M., B. A. Stanton. Renal Physiology. 5th ed. St. Louis: Mosby-Year Book Inc. 2012.

### Respiration

Mortola, J.P. "Intermediate/Advanced Respiratory Topics"

<http://www.mcgill.ca/physiology/resources/online-courses>

Mortola, J.P. Respiratory Physiology of Newborn Mammals: A Comparative Perspective. Baltimore: Johns Hopkins University Press, 2001.

West, J.B. Respiratory Physiology – The Essentials. Baltimore: William and Wilkins.

### Cardio

Guyton, Arthur C. Textbook of Medical Physiology. Philadelphia and London: W. B. Saunders Company, 2006

*McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see <http://www.mcgill.ca/srr/honest> for more information) Every student has the right to write term papers, examinations, and theses in English or French, except in courses where knowledge of the language is one of the objectives of the course. In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.*