PHGY 312
RESPIRATORY, RENAL & CARDIOVASCULAR PHYSIOLOGY
COURSE SCHEDULE
Winter 2024

Lecturers: Dr. John Hanrahan (Coordinator), john.hanrahan@mcgill.ca
Dr. Sheldon Magder, sheldon.magder@mcgill.ca
Dr. Alvin Shrier, alvin.shrier@mcgill.ca
Dr. James Martin, james.martin@mcgill.ca

Course Secretary:
Maria Dimas, undergrad2.physiology@mcgill.ca

Location McIntyre Bldg., Room 1034
Time: Mondays, Wednesdays & Fridays from 12:35pm - 1:25pm

Date	*Day*	*Lecture Title*	*Lecture*	*Lecturer*
Jan. 5	F	Transmembrane potentials; resting potential; slow and fast action potentials	1	A.S
8	M	Ionic channels; activation, inactivation, pharmacology, voltage dependence, current-voltage relations	2	A.S.
10	W	Automaticity: pacemaker mechanism, controls, dynamics; conduction: sequence, local current flow	3	A.S.
12	F	ECG: and cardiac arrhythmias	4	A.S.
15	M	EC coupling; mechanics	5	A.S.
17	W	**Cardio: Tutorial**		**A.S.**
19	**F**	Overview of circulation; Basic principles: Pressure-flow & Pressure-volume relationships: structure of the circulation ***Sign up on myCourses for oral presentation (by professor) starting at 11:00am***	6	S.M.
22	**M**	The heart as a pump. Basis of cardiac function curve (Starling's Law) and the cardiac pressure-volume relationship ***Topics for oral presentation on myCourses (for review only)***	7	S.M.
24	W	Principle of venous return and bathtub concept. Stressed and unstressed vascular volume	8	S.M.
26	**F**	Integration of cardiac and return function and the control of cardiac output ***Sign up on myCourses for individual presentation topic starting at 11:00am***	9	S.M.
29	M	Control of circulation: baroreceptor reflex, myogenic response, flow-mediated response; metabolic response. The problem of standing up	10	S.M.
31	W	Special circulations including the coronary, cerebral and pulmonary circulations. Integrated cardiovascular responses including valsalva maneuver, and tilt	11	S.M.
Feb. 2	**F**	**Cardio: Tutorial**		**S.M**
5	M	Needs for Oxygen	12	J.M
7	W	The functional design of the respiratory pump	13	J.M
8	**TH**	**Class Test #1 – Cardio Section (Please see page 2 for details)**		
9	F	Lung expansion	14	J.M
12	M	Breathing in and out	15	J.M
14	W	Distribution of the inspired air	16	J.M

Date	Day	Lecture Title	Lecture	Lecturer
16	F	Gases in the body	17	J.M
19	M	Neural regulation	18	J.M
21	W	The VE response to hypoxia and hypercapnia	19	J.M
23	F	High altitude	20	J.M
26	M	Muscle exercise	21	J.M
28	W	Perinatal respiration	22	J.M
Mar. 1	F	Practical assessment of respiratory function in human subjects	23	J.M
		READING WEEK (March 4 - 8)		
11	M	**Respiration: Tutorial**		**J.M.**
13	W	Functional Microanatomy of the Kidney	24	J.H.
14	TH	**Class Test #2 – Respiration Section (Please see page 2 for details)**		
15	F	Glomerular Filtration (GFR) and the clearance concept	25	J.H.
18	M	Renal Plasma flow and regulation of blood flow	26	J.H.
20	W	Membrane mechanisms and epithelial transport. Diffusion, permeability.	27	J.H.
22	F	Active transport. Features unique to epithelial cells. Renal handling of organic solutes I (glucose).	28	J.H.
25	M	Renal handling of organic solutes II. Transport of amino acids, urea, creatinine, PAH, urate and proteins.	29	J.H.
27	W	Sodium and chloride transport I. Late proximal tubule, loop of Henle	30	J.H.
29	F	**Good Friday – NO CLASS**		
Apr. 1	M	**Easter Monday – NO CLASS**		
3	M	Sodium and chloride transport II. Distal tubule & cortical collecting duct. Water transport and aquaporins. Intro to the renal concentrating mechanism	31	J.H.
5	F	Renal concentrating mechanism. Efficiency and control, role of urea, diuretics, intracellular osmolytes	32	J.H.
8	M	Acid-Base Balance	33	J.H.
10	W	Potassium homeostasis and the renal excretion of potassium	34	J.H.
*11	TH	Control of Body Water and NaCl balance	35	J.H.
12	F	**Renal: Tutorial**		**J.H.**

** Thursday, April 11, 2024 follows a "Monday" schedule*

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

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EVALUATION

1. Class Tests – (16% each)

There are 2 class tests. The first class test is on **Thursday, February 8, 2024** at **7:00pm-8:30pm, Palmer Theatre, Room 522** and will cover the **"Cardio"** section of the course. The second class test is on **Thursday, March 14, 2024** at **7:00pm-8:30pm, Martin Theatre, Room 504** and will cover the **"Respiration"** 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 submit a note to the Course Secretary, Maria Dimas at undergrad2.physiology@mcgill.ca **within one week 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 make-up tests!***

2. Assignment (Oral Presentation) – (20%)

Sign up on *myCourses* on **Friday, January 19, 2024 starting at 11:00am** on **ONE** of the professor's section that interests you (**Cardio:** Drs. Shrier & Magder, **Respiration:** Dr. Martin, **Renal:** Dr. Hanrahan); 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 **Friday, January 26, 2024 starting at 11:00am** on *myCourses* (one topic per student). 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 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 11 – March 15**
b) The oral presentations for the **"Respiration"** section will be from **March 18 – April 3**
c) The oral presentations for the **"Renal"** section will be from **March 25 – April 12**

******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 – (48%)

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 32%; the oral assignment counts for 20%; and the final exam is worth 48%, 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, 514-398-6011.

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:

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

Murray, J. The normal lung

CARDIO:

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