# PHGY 312
# RESPIRATORY, RENAL & CARDIOVASCULAR PHYSIOLOGY
# COURSE SCHEDULE
# Winter 2020

**Lecturers:** Dr. John Hanrahan (Coordinator), Room 1016A, McIntyre building, 514-398-8320, john.hanrahan@mcgill.ca
Dr. Sheldon Magder, Glen Hospital, sheldon.magder@muhc.mcgill.ca
Dr. Alvin Shrier, Room 170, Bellini Building, 514-398-2272, alvin.shrier@mcgill.ca
Dr. James Martin, MUHC Hospital, 514-934-1934 x76304, james.martin@mcgill.ca

**Location: Strathcona Anatomy & Dentistry Bldg. (3640 University), Room 2/36**
**Monday/Wednesday/Friday 8:35am - 9:25am**

| *Date* | *Day* | *Lecture Title* | *Lecture* | *Lecturer* |
|---|---|---|---|---|
| **Jan. 6** | M | Functional Microanatomy of the Kidney | 1 | J.H. |
| 8 | W | Glomerular Filtration (GFR) and the clearance concept | 2 | J.H. |
| 10 | F | Renal Plasma flow and regulation of blood flow | 3 | J.H. |
| 13 | M | Membrane mechanisms and epithelial transport. Diffusion, permeability. | 4 | J.H. |
| 15 | W | Active transport. Features unique to epithelial cells. Renal handling of organic solutes I (glucose). | 5 | J.H. |
| 17 | F | Renal handling of organic solutes II. Transport of amino acids, urea, creatinine, PAH, urate and proteins. | 6 | J.H. |
| 20 | M | Sodium and chloride transport I. Late proximal tubule, loop of Henle | 7 | J.H. |
| 22 | W | Sodium and chloride transport II. Distal tubule & cortical collecting duct. Water transport and aquaporins. Intro to the renal concentrating mechanism<br>**Sign up on *myCourses* for oral presentation (by professor) starting at 11:00am** | 8 | J.H. |
| 24 | F | Renal concentrating mechanism. Efficiency and control, role of urea, diuretics, intracellular osmolytes | 9 | J.H. |
| 27 | M | Acid-Base Balance<br>**Topics for oral presentation on myCourses (for review only)** | 10 | J.H. |
| 29 | W | Potassium homeostasis and the renal excretion of potassium<br>**Sign up on myCourses for individual presentation topic starting at 11:00am** | 11 | J.H. |
| 31 | F | Control of Body Water and NaCl balance | 12 | J.H. |
| **Feb. 3** | M | Transmembrane potentials; resting potential; slow and fast action potentials | 13 | A.S |
| 5 | W | Ionic channels; activation, inactivation, pharmacology, voltage dependence, current-voltage relations | 14 | A.S. |
| 7 | F | Automaticity: pacemaker mechanism, controls, dynamics; conduction: sequence, local current flow | 15 | A.S. |
| 10 | M | ECG: and cardiac arrhythmias | 16 | A.S. |
| **11** | **T** | **TEST #1 – Renal (No class) – 7:00pm - 8:30pm, Palmer Howard Room 522 (McIntyre Bldg.) Please bring your McGill I.D card to the exam.** | | |
| 12 | W | EC coupling; mechanics | 17 | A.S. |
| **14** | **F** | **CLASS CANCELLED** | | |
| 17 | M | Overview of circulation; Basic principles: Pressure-flow & Pressure-volume relationships: structure of the circulation | 18 | S.M. |
| 19 | W | The heart as a pump. Basis of cardiac function curve (Starling's Law) and the cardiac pressure-volume relationship. | 19 | S.M. |

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| 21 | F | Principle of venous return and bathtub concept. Stressed and unstressed vascular volume | 20 | S.M. |
| 24 | M | Integration of cardiac and return function and the control of cardiac output. | 21 | S.M. |
| 26 | W | Control of circulation: baroreceptor reflex, myogenic response, flow-mediated response; metabolic response. The problem of standing up. | 22 | S.M. |
| 28 | F | Special circulations including the coronary, cerebral and pulmonary circulations. Integrated cardiovascular responses including valsalva maneuver, and tilt. | 23 | S.M. |
| | | ***READING WEEK (March 2 to March 6)*** | | |
| **Mar. 9** | **M** | Needs for Oxygen | 24 | J.M |
| **11** | **W** | **TEST #2 – Cardio (No class) – 7:00pm - 8:30pm, Palmer Howard Room 522 (McIntyre Bldg.) Please bring your McGill I.D card to the exam.** | | |
| 13 | F | The functional design of the respiratory pump | 25 | J.M |
| 16 | M | Lung expansion | 26 | J.M |
| 18 | W | Breathing in and out | 27 | J.M |
| 20 | F | Distribution of the inspired air | 28 | J.M |
| 23 | M | Gases in the body | 29 | J.M |
| 25 | W | Neural regulation | 30 | J.M |
| 27 | F | The VE response to hypoxia | 31 | J.M |
| 30 | M | High altitude | 32 | J.M |
| Apr. 1 | W | Temperature and breathing | 33 | J.M |
| 3 | F | Muscle exercise | 34 | J.M |
| 6 | M | Perinatal respiration | 35 | J.M |
| 8 | W | **Tutorial: Respiration Section** | 36 | J.M |
| **10** | **F** | **GOOD FRIDAY – NO CLASS** | | |
| **13** | **M** | **EASTER MONDAY – NO CLASS** | | |
| ***14** | **T** | **TBD – LAST DAY OF CLASSES** | | |

****Tuesday, April 14th, 2020 follows a "Friday" schedule***

**TUTORIALS**

**Renal Section: Dr. Hanrahan:**
**Wednesday, February 5, 2020** from **5:30pm – 6:30pm, Room 521 (Meakins Theatre), McIntyre Bldg.**

**Cardio Section: Dr. Shrier / Dr. Magder:**
**Monday, March 9, 2020** from **5:30pm – 7:30pm**, **Room 521 (Meakins Theatre), McIntyre Bldg.**

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

# EVALUATION

**1. Class Tests – (16% each)**

There are 2 class tests. The first class test is on **Tuesday, February 11, 2020** at **7:00pm-8:30pm, Palmer Howard Theatre, Room 522 (McIntyre Bldg.)** and will cover the **"Renal"** section of the course. The second class test is on **Wednesday, March 11, 2020** at **7:00pm-8:30pm, Palmer Howard Theatre, Room 522 (McIntyre Bldg.)** and will cover the "**Cardio"** 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 type. 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 Wednesday January 22, 2020 starting at 11:00am** on **one** of the professor's section that interests you (**Renal:** Dr. Hanrahan, **Cardio:** Drs. Shrier & Magder, **Respiration:** Dr. Martin) (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 29, 2020 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 again on *myCourses*. Please keep checking *my courses* for the date and time of this sign up. Please note that the dates are scheduled between **3 to 3.5 hour time slots** and it is mandatory that all students in the group attend.

a) The oral presentations for the **"Renal"** section will be from **March 12 – March 20**
b) The oral presentations for the **"Cardio"** section will be from **March 17 – March 23**
c) The oral presentations for the **"Respiration"** section will be from **March 23 – April 3**

******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

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