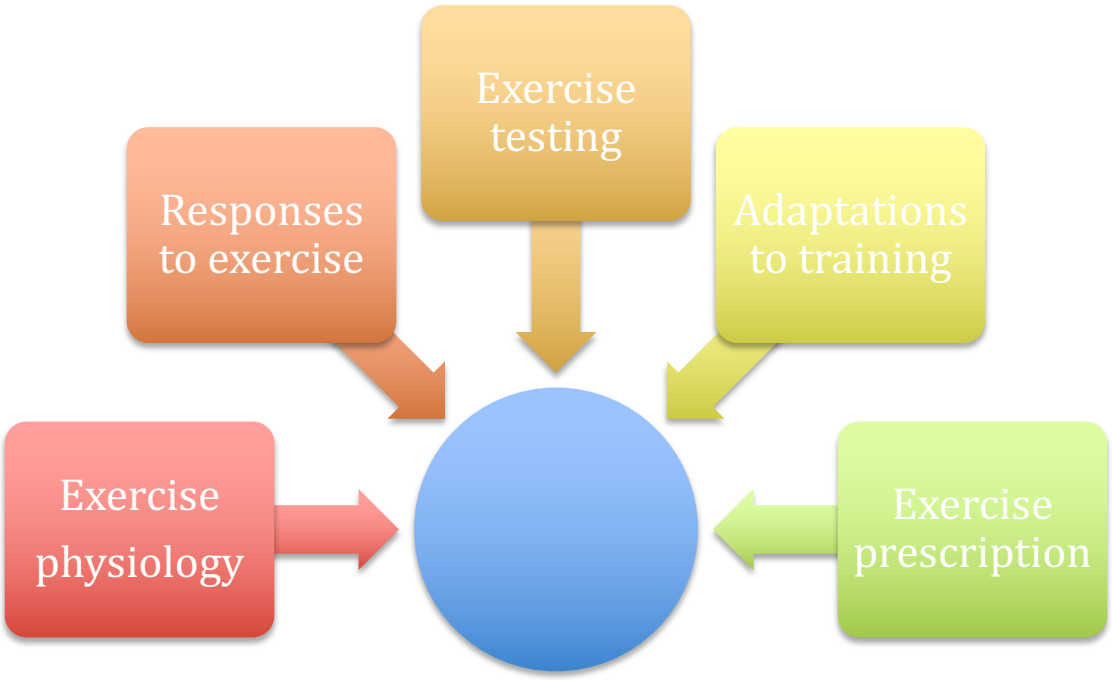
2022 COURSE OUTLINE

PHTH 440 - CLINICAL EXERCISE PHYSIOLOGY

Instructor: Marc Roig, Ph.D.
Office: Davis House D30.
Telephone: (514) 398-4400 ext. 00841.
Email: marc.roigpull@mcgill.ca
Virtual office hours: Upon request.
Laboratory instructor: Ana Maria Moga, PT, MSc, PhD (candidate).
Email: ana.moga@mcgill.ca
Virtual office hours: Wednesday: 13:30pm-14:30pm (upon request).
Lecture days & time: Monday and Wednesday: 11:30am-1:00pm.
Location: McMed 330
Dates: August 31st to December 5th.

COURSE OVERVIEW



INSTRUCTIONAL METHODS

21 x 1.5 hours of lectures, discussions, and quizzes.

- ***Module 1: Exercise physiology****:* will cover basic concepts of exercise physiology and metabolism as well as of neural control of movement and muscle structure and function.
- ***Module 2: Acute responses to exercise****:* will cover common physiological responses to acute exercise of the different bodily systems with an emphasis on the cardiorespiratory system.
- ***Module 3: Exercise testing****:* will cover basic principles of exercise testing and guidelines for the interpretation of the most commonly used tests to assess cardiorespiratory fitness, strength and flexibility.
- ***Module 4: Chronic adaptations to exercise****:* will cover main physiological adaptations to chronic exercise (training) with an emphasis on the cardiorespiratory, muscular, and nervous system.
- ***Module 5: Exercise prescription****:* will cover general concepts of exercise prescription with a special emphasis on clinical populations.

1 x 3 hours laboratory practice

- ***Laboratory practice***: one 3-hour laboratory session on how to perform a graded exercise test (GXT).

1 x 20 minutes case study presentation

- ***Presentation of case study****:* one class presentation solving a clinical case for exercise prescription.

EVALUATION

20%: Laboratory report.
20%: Quizzes.
30%: Presentation of case study.
30%: Final examination.

Laboratory report

Laboratory sessions will take place for one week where the lectures of the course will be stopped. Students can access a video showing an overview of the most important procedures of the laboratory session (see video on MyCourses/content/Laboratory Video). **Attending the laboratory session is mandatory**.

Ana Maria Moga (ana.moga@mcgill.ca) is the instructor responsible for the laboratory practice. **Questions regarding the laboratory sessions, groups, reports, and grades need to be directed at her**. Only 8 time slots are available, and these slots will be taken on a first come first-served basis. Students will need to form groups of 5 (students can sign up

on MyCourses and select the group based on availability). Students will come to the Jewish Rehabilitation Hospital (JRH) in Laval. The laboratory session will last 3 hours approximately. Two of the students will volunteer as testing subjects (please bring sports clothing). **Please note that the laboratory practice requires (lancet) blood sampling so do not volunteer if you are apprehensive to this procedure**. The laboratory instructor will teach students how to do the initial assessment and perform a graded exercise test (GXT).

The laboratory practice will be assessed by one per-group laboratory report of **no more than 1500 words excluding tables, figures and references**. Times New Roman 12 font, double line spacing and margins set at 1cm are required. Use the most convenient reference style. The exercise testing data collected during the laboratory practice will be used for writing the laboratory report. Detailed instructions of the tasks of the laboratory practice will be provided by Ana Maria Moga during a lecture preceding the laboratory practice. The report needs to be submitted on MyCourses no later than **December 6**.

The objective of the report is to present a comprehensive analysis and interpretation of the data collected in the laboratory. **The report will be evaluated based on the following criteria**:

Presentation (10%): accurate and complete description and presentation and of the data (exercise test findings) provided.
Interpretation (10%): accurate and critical analysis and interpretation of the data (exercise test findings) provided in relation to normative values.
Peer evaluation (-5%): evaluation of each member of the group by their peers. **Only when the score provided is below 5**, **students will email** ana.moga@mcgill.ca **with the name of the group member(s) evaluated and the mark given**. **Do NOT send Ana Maria Moga an email if your evaluation score is 5**. Consider the quantity and quality of the work performed by your peers and assess it based on the criteria of the evaluation grid using whole numbers. This assessment will be kept strictly confidential. Please note that the **peer evaluation score DOES NOT add points to your mark, it only subtracts them (e.g., you need to obtain 5 points from all members of your group if you want to keep your mark).** Peer evaluation was introduced to increase co-responsibility within the group.

Evaluation grid*

	10 (Excellent)	8 (Very good)	6 (Good)	4 (Satisfactory)	0 (Unsatisfactory)
Presentation					
Interpretation					
Peer evaluation					

Please note that although style is not formally in the grid, it will be considered. Aspects such as writing quality, coherence, clarity, lack of grammatical mistakes and typos and accuracy in referencing will be considered. More than 5 typos/grammatical mistakes, lack of clarity and accuracy in referencing will lower the mark significantly. Please note that even though each criterion is assessed independently, a poor score in style may affect the rest of the criteria.

Quizzes

During some of the lecture days, we will have quizzes that will prepare students for the final exam. There are **5 quizzes** during the course and **each** one counts 4% of the final mark (20% total). Each quiz covers the material given in one of the modules. All quizzes, which will be completed in class, will have 12-15 questions that will need to be completed in ~25 minutes. **All quizzes will start and finish at the same time (see schedule for details). You will need a computer or tablet to complete the quiz in class.**

Presentation of case study

Students will work in groups of 5 (you can sign up on MyCourses and select the groups) to prepare a 15 + 5 minutes presentation about a specific case study. Presentations will be delivered by all members of the group on one of the 3 last days of the course (see program). A copy of the power point presentation should be sent to the course instructor (marc.roigpull@mcgill.ca) no later than **November 27**. **After this date, the presentation cannot be modified**. The objective of the presentation is to evaluate the capacity of students to perform an initial assessment of a patient and prepare a comprehensive exercise program based on the clinical condition/s and the goals of the patient. **On the first day of class, an example of this presentation and detailed instructions will be provided.**

The presentation should contain the following sections:

Initial assessment: determine the risk level of the patient and define absolute and relative contraindications to exercise based on the information provided. Identify the most common contraindications and things to consider during initial assessment. Describe which clinical tests you will do/require and mention additional information that you are lacking and that you would like to have.

Exercise testing: define and describe which exercise tests are needed in this specific case. You cannot do all the tests, but you can select and prioritize the most important ones to be used. Explain why you choose those tests and if modifications of the protocols are required for this patient. Describe which outcomes you will obtain and how and when will you be measuring them.

Exercise prescription: using the information provided and gathered during the exercise testing develop a specific training program including the types of exercises and parameters required (frequency/intensity/volume). Discuss the progression of training, how you will establish this progression and establish specific milestones that the patient will need to achieve.

The presentation will be evaluated based on the following criteria:

Completeness (10%): all sections described above must be presented. The use of diverse, high-quality sources of information (e.g. electronic databases, journals, recommendations) will be considered. The idea is to gather as much information as possible to perform a critical assessment and design an appropriate exercise testing and prescription program.

Interpretation (10%): Accurate and critical interpretation of the information provided (e.g. medical history, laboratory tests and diagnosis). It is important to identify the most important information in relation to exercise testing and prescription. Identify red flags (e.g. contraindications and precautions to consider), facilitators and barriers and plan your exercise testing and prescription accordingly.
Questions (10%): in the last 5-10 minutes the instructor will ask questions in relation to the case study. Responses will be evaluated based on your ability to respond appropriately and accurately.
Peer evaluation (-5%): evaluation of each member of the group by their peers. **Only when the score provided is below 5**, **students will send** marc.roigpull@mcgill.ca **with the name of the group member(s) evaluated and the mark given**. **Do NOT send an email if your score is 5**. Consider the quantity and quality of the work performed by your peers and assess it based on the criteria of the evaluation grid using whole numbers. This assessment will be kept strictly confidential. Please note that the **peer evaluation score DOES NOT add points to your mark, it only subtracts them (e.g., you need to obtain 5 points from all members of your group if you want to keep your mark).** Peer evaluation was introduced to increase co-responsibility within the group.

Evaluation grid*

	10 (Excellent)	8 (Very good)	6 (Good)	4 (Satisfactory)	0 (Unsatisfactory)
Completeness					
Interpretation					
Questions					
Peer-evaluation					

Please note that although style is not formally in the grid it will be considered. Aspects such as writing quality, coherence, clarity, lack of grammatical mistakes and typos and accuracy in referencing in the power point will be considered. More than 5 typos/grammatical mistakes, lack of clarity and accuracy in referencing will lower the mark significantly. Please note that even though each criterion is assessed independently, a poor score in style may affect the rest of the criteria.

Final examination
The final exam will be completed in person. The exam will have 50-60 questions. Questions will have a format like the one used in the quizzes. The final examination includes all the materials of the course, including lectures, readings, case presentations and podcasts.

COURSE MATERIALS

Main bibliographic resources (required)
Original and review **articles** relevant to the course content to be covered in each lecture will be posted on the PHTH 440 MyCourses site (www.mcgill.ca/mycourses/). Students are encouraged to read these materials before each lecture. **Podcasts** are also part of the course material. You can access the podcasts in any podcast platform (Apple, Spotify, Anchor).

Reference textbooks (not required)

Exercise physiology

- McArdle WD, Katch FI & Katch VL. Exercise Physiology: Nutrition, Energy and Human Performance, 9th Edition. Lippincot Williams & Wilkins 2015
- Brooks GA, Fahey TD, Baldwin KM. Exercise Physiology. Human Bioenergetics and its Applications. 4th Edition. McGraw Hill, New York, NY, USA, 2005.

Clinical exercise physiology

- Ehrman JK, Gordon PM, Visich PS & Keteyian SJ. Clinical Exercise Physiology, 2nd Edition. Human Kinetics, Windsor, ON, Canada, 2009.
- LeMura L & von Duvillard S. Clinical Exercise Physiology: Application and Physiological Principles. Lippincott Williams & Wilkins, New York, NY, USA, 2004.

Exercise testing

- Wasserman K, Hansen JE, Sue DY, Stringer WW, Sietsma KE, Sun XG & Whipp BJ. Principles of Exercise Testing and Interpretation: Including Pathophysiology and Clinical Applications, 5th Edition. Lippincott Williams & Wilkins, New York, NY, USA, 2022.
- Jones NL. Clinical Exercise Testing, 4th Edition. WB Saunders Company, Philadelphia, Pennsylvania, USA, 1999.

SCHEDULE

#	Date	Lecture
1	Aug 31	Course introduction + ***Presentation case study by Marc Roig***
Module 1: EXERCISE PHYSIOLOGY		
	Sep 5	Labor Day
2	Sept 7	Exercise physiology I
3	Sept 12	Exercise physiology II
4	Sept 14	Exercise physiology III
Module 2: ACUTE RESPONSES		
5	Sept 19	Acute responses I + **Quiz 1**
6	Sept 21	Acute responses II
7	Sept 26	Acute responses III
Module 3: EXERCISE TESTING		
8	Sept 28	Exercise testing I + **Quiz 2**
9	Oct 3*	Exercise testing II
10	Oct 5	Exercise testing III
Module 4: CHRONIC ADAPTATIONS		
	Oct 10	Thanksgiving Day
11	Oct 13**	Training adaptations I + **Quiz 3**
12	Oct 17	Training adaptations II
13	Oct 19	Training adaptations III
14	Oct 24	Training adaptations IV
15	Oct 26	***Presentation of laboratory session by Ana Maria Moga***
Laboratory week from October 31 to November 4		
Module 5: EXERCISE PRESCRIPTION		
16	Nov 7	Exercise prescription I + **Quiz 4**
17	Nov 9	Exercise prescription II
18	Nov 14	Exercise prescription III
19	Nov 16	Exercise prescription IV
20	Nov 21	Exercise prescription V
21	Nov 23	Exercise prescription VI
22	Nov 28	Presentations (groups 1-2) + **Quiz 5**
23	Nov 30	Presentations (groups 3-5)
24	Dec 5	Presentations (groups 6-8)

* This lecture will be recorded and there will not be in class in-person.

** Note that this class is on Thursday.

LEARNING OBJECTIVES

The learning objectives of the course have been classified using the Essential Competency Levels for Physiotherapists in Canada. The course will help students develop the following core competencies:

General	Activity	Assessments	Milestone
Understand the principles of exercise physiology and metabolism	Lectures Podcasts Readings Case study	Quizzes Written exams Laboratory report Case presentation	NA
Describe the main physiological responses to acute and chronic exercise	Lectures Podcasts Readings	Quizzes Written exam Laboratory report	NA
Understand principles of exercise testing and be able to interpret the results of clinical exercise tests	Lectures Readings Case study	Quizzes Written exam Laboratory report Case presentation	NA
Perform a graded exercise test safely and effectively	Laboratory practice	Laboratory report	NA
Explain the principles for the safe and effective prescription of exercise in special populations	Lectures Podcasts Readings Case study	Quizzes Written exam Case presentation	NA
Know the evidence behind the effectiveness of exercise interventions in special populations and the most prevalent health clinical conditions	Lectures Podcasts Readings Case study	Quizzes Written exam Case presentation	NA
Expertise	**Activity**	**Assessments**	**Milestone**
Employ a client-centered approach	Laboratory practice	Laboratory report	1.1.6
Ensure physical and emotional safety of the client.	Lectures Podcasts Readings Laboratory practice	Quizzes Written exams Laboratory report	1.2.1, 1.2.3, 1.2.4, 1.2.5
Conduct client assessment	Lectures Readings Laboratory practice Case study	Quizzes Written exams Laboratory report Case presentation	1.3.1, 1.3.3, 1.3.4, 1.3.7
Establish a diagnosis and prognosis	Lectures readings Laboratory practice Case study	Quizzes Written exams Laboratory report Case presentation	1.4.1, 1.4.2
Develop, implement, monitor, and evaluate an intervention plan	Case study	Case presentation	1.5.1, 1.5.2, 1.5.3
Complete or transition care	Lectures Case study	Case presentation	1.6.1

Communication	**Activity**	**Assessment**	**Milestone**
Use oral and non-verbal communication effectively	Laboratory practice Case study	Case presentation	2.1.1, 2.1.4
Use written communication effectively	Laboratory practice	Laboratory report	2.2.1, 2.2.2
Use communication tools and technologies effectively	Case study	Case presentation	2.4.3
Collaboration	**Activity**	**Assessment**	**Milestone**
Facilitate collaborative relationships	Laboratory practice Case study	Case presentation Laboratory report	3.2.1, 3.2.4, 3.2.5
Contribute to effective teamwork	Laboratory practice Case study	Case presentation Laboratory report	3.3.1, 3.3.3, 3.3.5
Management	**Activity**	**Assessment**	**Milestone**
Ensure a safe practice environment	Laboratory practice	Laboratory report	4.3.1, 4.3.2, 4.3.4,
Scholarship	**Activity**	**Assessment**	**Milestone**
Use an evidence- informed approach in practice	Lectures Readings Laboratory practice Case study	Quizzes Written exams Laboratory report Case presentation	6.1.1, 6.1.2, 6.1.4
Engage in scholarly inquiry	Laboratory practice Case study	Quizzes Written exams Laboratory report Case presentation	6.2.3, 6.2.4
Professionalism	**Activity**	**Assessment**	**Milestone**
Embrace social responsibility as a health professional	Lectures Readings Case study	Case presentation	7.3.2

POLICY STATEMENTS

Right to submit in English or French written work that is to be graded [approved by Senate on 21 January 2009]:

"In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded."

"Conformément à la Charte des droits de l'étudiant de l'Université McGill, chaque étudiant a le droit de soumettre en français ou en anglais tout travail écrit devant être noté (sauf dans le cas des cours dont l'un des objets est la maîtrise d'une langue)."

Academic Integrity Statement [approved by Senate on 29 January 2003]:

"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 www.mcgill.ca/students/srr/honest/ for more information)."

"L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le site www.mcgill.ca/students/srr/honest/)."