

PTH 440: CLINICAL EXERCISE PHYSIOLOGY

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Office hours: by appointment only

Lecture days, time & location: Monday & Wednesday, 8:30 to 10:00, Currie Gymnasium room 305/6

Date range: Jan 06 to Apr 11

COURSE DESCRIPTION

This course reviews the main physiological responses to acute and chronic exercise of the different bodily systems. Principles of exercise testing and guidelines for the interpretation of the most commonly used tests to assess cardiorespiratory fitness and other physiological parameters are also provided. The course covers basic concepts of exercise prescription with a special emphasis on special populations. The evidence supporting the effectiveness of different exercise interventions on selected health clinical conditions is discussed.

COURSE OBJECTIVES

By the end of this course, the student will:

- Understand the main physiological responses to acute and chronic exercise.
- Become familiar with the principles of exercise testing and to interpret the results of fitness tests.
- Safely and effectively prescribe exercise in special populations.
- Know the evidence behind the use of exercise interventions for some of the most prevalent health clinical conditions.

COURSE STRUCTURE

3 credits: 39 hours

25 x 1.5 hours lectures

1.5 hours: Student Group Presentations

COURSE MATERIALS

Main bibliographic resources (required)

References of book chapters as well as 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.

Additional bibliographic resources (recommended)

For those who want to expand their knowledge additional references relevant to the course content to be covered in each lecture will be provided.

Reference textbooks (not required)

Exercise physiology

- Powers SK & Howley ET. Exercise Physiology: Theory and Application to Fitness and Performance, 8th Edition. McGraw Hill, New York, NY, USA, 2012.
- McArdle WD, Katch FI & Katch VL. Exercise Physiology: Nutrition, Energy and Human Performance, 7th Edition. Lippincott Williams & Wilkins 2010
- 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, 2012.
- Jones NL. Clinical Exercise Testing, 4th Edition. WB Saunders Company, Philadelphia, Pennsylvania, USA, 1997.

EVALUATION

30%: Midterm examination: lectures 1-13

10%: Case report 1

10%: Case report 2

30%: Term paper (20%) and student group presentation (10%)

20%: Final examination: lectures 15-24

Case report (10% final mark each)

Students will be provided with clinical findings and graded exercise test data/information on a case with a specific clinical condition. In groups of three (3) they will (a) analyze and interpret the clinical and exercise test results provided and (b) write a three (c) page case report according to the instructions that will be provided.

* A grid with objective evaluation criteria for the case report will be provided.

Term paper (30% final mark)

Students will be assigned to a group of six (6). Each group will nominate a representative that will be responsible for communicating with the instructor. Once the groups are created the instructor will randomly assign each group to a clinical condition. Students will need to write a review paper about the clinical condition that will follow this structure.

- 1- **Pathophysiology:** to review the basic pathophysiology of the clinical condition.
- 2- **Exercise testing:** to identify tests that need to be administered and precautions which need to be taken during testing of people with the clinical condition.
- 3- **Exercise prescription:** summarize particular aspects to consider (indications and contraindications) when prescribing exercise in people with this clinical condition.
- 4- **Review of the evidence:** review the existing literature and summarize the evidence in favor or against the use of different types of exercise (resistance, endurance) in people with the clinical condition.

* A grid with objective evaluation criteria for the term paper will be provided.

PROGRAM (subject to change)

Lecture slides will be posted on the MyCourses site (www.mcgill.ca/mycourses/) under the section PHTH 440 in PowerPoint and PDF format in advance of each lecture.

	Date	Title of Lecture
EXERCISE PHYSIOLOGY		
1	Jan 6	Introduction
2	Jan 8	Bioenergetics
3	Jan 13	Exercise Metabolism
ACUTE RESPONSES TO EXERCISE		
4	Jan 15	Hormonal responses to exercise
5	Jan 20	Immune system and exercise
6	Jan 22	Circulatory responses to exercise

7	Jan 27	Respiratory responses to exercise
8	Jan 29	Acid base regulation during exercise
9	Feb 3	Temperature regulation during exercise
10	Feb 5	Neural control of movement
11	Feb 10	Skeletal muscle structure and function
CHRONIC RESPONSES TO EXERCISE		
12	Feb 12	Adaptations to endurance exercise
13	Feb 17	Adaptations to resistance exercise
14	Feb 19	Midterm exam – in class (Lectures 1-13)
EXERCISE TESTING		
15	Feb 24	Cardiopulmonary testing
16	Feb 26	Pathophysiology
17	March 10	Clinical exercise testing
	March 3	Study break
	March 5	Study break
18	March 12	Clinical applications of exercise testing *Term paper needs to be handed in at the end of the lecture
EXERCISE PRESCRIPTION		
19	March 17	General principles
20	March 19	Special populations I *Case Report 1 needs to be handed in at the end of the lecture
21	March 24	Special populations II
22	March 26	Clinical populations I
23	March 31	Clinical populations II
24	April 2	Clinical populations III *Case Report 1 needs to be handed in at the end of the lecture
	April 9	Review session (topics to be covered in the review session need to be emailed to the instructor by April 3rd)
		Final exam – during exam period (Lectures 15-24)

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/)."

Disability: If you have a disability please contact the instructor to arrange a time to discuss your situation. It would be helpful if you contact the Office for Students with Disabilities at 398-6009 before you do this.

Professional Conduct: Professionalism and accountability are expected throughout the course of the semester. This includes the on-going respectful nature of teacher-student as well as student-student interactions.

Technology in Class: Your respectful, attentive presence is expected, therefore while you are permitted to use your laptop in class, it is understood that you will not be using your laptop or cell-phone for social purposes during class time (e.g. email, msn, sms). Your cell phone should be on silence during class time and phone calls should only take place during the break or after class.

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