

## **POTH 434 MUSCULOSKELETAL BIOMECHANICS**

<b>Credits:</b>	3
<b>Prerequisite:</b>	EDPK 206 (Biomechanics of Human Movement)
<b>Instructor:</b>	Richard Preuss pht PhD Office: H308 (by appointment) 514-398-4400 x00652 richard.preuss@mcgill.ca
<b>Day:</b>	Mondays & Wednesdays
<b>Place:</b>	Stewart Biology Building S1/3
<b>Time:</b>	2:35pm - 3:55pm

**Course Description:** This is a lecture-based course, primarily covering the biomechanical properties of musculoskeletal tissues, the mechanical factors involved in their injury, and their potential for adaptation and recovery. Some fundamental principles of motion will also be reviewed, with the aim of integrating the biomechanics of motion with the properties of the biological tissues involved. The students will learn how these principles relate to traumatic and chronic injury, and begin to incorporate them into scientifically-based clinical evaluations and treatments. Students are expected to have a firm understanding of the topics covered in the prerequisite course EDPK206 (Biomechanics and Human Movement), and the much of the content of POTH434 will expand on this previous material.

**Course Structure and Instructional Method:** The course will take place over two (2) 1.5-hour sessions each week, for 13 weeks. The course will be primarily lecture-based, with any additional instructional methods and approaches to be announced.

**Optional Tutorial:** An optional tutorial will be held on Friday mornings, from 9:35am to 10:25am. Location TBD.

**General Learning Objectives:** At the end of the course, the student will be able to:

1. Describe, compare and contrast the fundamental biomechanical properties of various musculoskeletal tissues.

2. Compare and contrast the mechanisms through which various musculoskeletal tissues become injured, recover, and adapt to specific loading conditions.
3. Integrate these principles with prior knowledge of anatomy, physiology, physics and mathematics.
4. Describe the potential effects of exercise interventions, as well as other therapeutic techniques, on the health and biomechanical properties of various musculoskeletal tissues.
5. Begin to integrate the requirements for functional movement with the biomechanical properties of the musculoskeletal system.
6. Begin to integrate each of these concepts into their analysis and critique of the current scientific and clinical literature.

N.B. Specific learning objectives will be outlined prior to each section

**Course Content:**

- Review – Tissue Mechanics
- Connective Tissue Ultrastructure
- Bone
- Articular Cartilage
- Synovial Fluid and Joint Lubrication
- Fibrocartilage
- Menisci & Labra
- Intervertebral Disc
- Ligament
- Tendon
- Peripheral Nerves
- Skeletal Muscle
- Joint Stability
- Dynamic Stability
- Coordinated Movement

**Course Materials:**

**Handouts:** The instructor's PowerPoint presentation notes, and supplementary materials, will be available through WebCT Vista during the semester.

**Textbook:** No required text.

**Additional Readings:** References will be provided for each topic, which the students may use as readings to supplement the lecture material.

Specific resources and materials will be placed on reserve at the Health Sciences Library.

**Summative Evaluation:**

Exams	Description	%
Exam 1	Written; multiple choice and short answer format.	25%
Exam 2	Written; multiple choice and short answer format.	25%
Final Exam	Written; multiple choice and short answer format.	50%

**Special Requirements for Course Completion and Program Continuation:** In order to pass the course, a grade of at least C+ (60%) must be obtained as a total course mark. Please refer to the rules and regulation for information regarding final and supplemental examinations.

This course falls under the regulations concerning theoretical and practical evaluation as well as individual and group evaluation. Please refer to the section on marks in the Rules and Regulations for Student Evaluation and Promotion.

**Plagiarism/Academic Integrity:** "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/](http://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/](http://www.mcgill.ca/students/srr/honest/))."

**Attendance:** Students are expected to attend all lectures. Attendance for tutorials is optional.

**Right to submit in English or French written work that is to be graded:** 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).”*

**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.

**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.”

**In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.**