

POTH 620 MEASUREMENT IN REHABILITATION 1

Credits:	3
Prerequisite:	None
Instructor:	Richard Preuss pht PhD Office: Davis 7 richard.preuss@mcgill.ca

Course Description: The course will provide a theoretical basis for quantitative measurement techniques commonly used for assessment, diagnosis, treatment, and research in rehabilitation. The course will introduce approaches and instrumentation used to measure and evaluate biomechanical and physiological variables for quantitative analysis of human performance. Techniques for recording, processing, and analysing digital signals will be introduced in the context of electrophysiological signals, kinetics, and kinematics of human movement.

Specific Objectives

By the end of the course, the student should be able to:

1. Explain the basic principles that allow the collection of quantitative data using electronic equipment frequently found in a research or clinical setting.
2. Demonstrate why the acquisition, conditioning, processing, analysis and graphical presentation of electrical signals from sensors and transducers are useful and necessary.
3. Analyze the assumptions and simplifications that exist in laboratory and clinical research due to the inherent limitations of the instrumentation and measurement techniques.
4. Describe the use of sensors and transducers for biomedical measurements in laboratory and clinical settings.
5. Design the theoretical and practical implementation of quantitative assessment procedures and analytical methods in a research project in clinical rehabilitation.
6. Perform basic data manipulation and analysis using the Matlab programming platform.

Course Structure: Course material will be delivered using a flipped-classroom approach. Pre-recorded lectures will be available via Stream. Links to each recording, and an outline of its content, will be posted on MyCourses. Students are responsible for covering specific topics each week, as outlined in the schedule posted on MyCourses. In addition, one 3-hour session will be held each week, with student having the option attending in person or joining the session via video conferencing (links for each session will be posted on MyCourses).

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Required and recommended reading: Occasionally, a set of the assigned readings will be made available to the students at least one week prior to each lecture. Lecture notes will also be made available on MyCourses.

Copyright: Instructor generated course materials are protected by law and may not be copied or distributed in any form or in any medium without explicit permission of the instructor. Note that infringement of copyright can be subject to follow up by the university under the Code of Student Conduct and Disciplinary Procedure.

Course Content

- Measurement Error
- Time, Frequency & A/D Conversion
- Signal, Noise & Filters
- Kinetics
- Postural Sway
- Kinematics
- Continuous Phase Analysis
- Electromyography
- Inverse Dynamics

Methods of Evaluation

1. **Short Assignments:** Ten short assignments, based on the material and topics covered in class, using the Matlab programming platform.

Content: Specific guidelines will be given for each assignment.

Value: 70% of the final grade (7% per assignment)

2. **Inverse Dynamics Assignment:** An assignment based on the inverse dynamics approach to approximating joint moments and forces, using the Matlab programming platform.

Content: Specific guidelines will be given for the assignment.

Value: 30% of the final grade

Plagiarism/Academic Integrity: McGill University and the Faculty of Medicine and Health Sciences value academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the [McGill University Code of Student Conduct and Disciplinary Procedures](#) and the [Faculty of Medicine and Health Sciences Code of Conduct](#)

L'université McGill et Faculte de Medecine et des Sciences de la Sante attachent une haute importance à l'honnêteté académique. Ils incombent par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que

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les conséquences que peuvent avoir de telles actions, selon le [Université de McGill Code de conduite de l'étudiant et des procédures disciplinaires](#) et [Faculté de médecine et des sciences de la santé](#)

Attendance: Students are required to attend all lectures and student project presentations.

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.

Course Accessibility: 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 [Student Accessibility and Achievement](#) at 514-398-6009 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.