

## POTH 639 MOTOR CONTROL

**Credits:** 3

**Prerequisites:** none

**Instructors:** Mindy Levin, PT, PhD (Co-ordinator)  
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**Date and time of lectures:** Mondays, 08:00-11:00 am

**Course Structure:** 3 hours per week, divided into lectures, workshops and class discussions.

**Calendar Course Description:** Theoretical course with practical demonstrations and applications providing an overview of basic anatomy of the motor system, current knowledge of how movement is controlled by the nervous system and how motor skills are learned. Models of motor control will be introduced and discussed including the action-perception theory, force control theory, internal models and the equilibrium point theory. Motor learning theories related to muscular and neurological plasticity applicable to orthopaedic and neurology clinical practice will be introduced and discussed.

**Online Course Evaluations:** Students are strongly encouraged to complete the online course evaluations at the end of the term. Data obtained from these evaluations are used to provide instructors with feedback as well as for identifying situations where a course or instructor needs assistance. The feedback and suggestions contained in the responses are highly valued and helpful in ensuring that instructors make appropriate changes to courses as needed in order to facilitate student learning.

**General Learning Outcomes:** With attendance and active participation in class, the student will be actively engaged in developing the following core competencies as they related to the roles for physiotherapists, kinesiologists and trainers in the context of the practice of physiotherapy.

### **Expert**

1. Describe current theories of the production and organization of movement;
2. Understand the controversies and discriminating features of different theories of motor control;
3. Describe current theories of motor learning.

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4. Appraise the evidence for the effectiveness of different types and delivery schedules of feedback for motor learning in different patient populations;
5. Integrate motor control and motor learning theories in the design of treatment and/or training approaches to optimize motor function in different patient populations.

***Communicator***

1. Demonstrate the use of effective and appropriate terminology to describe motor control and motor learning in both verbal and written form.

***Scholarly practitioner***

1. Apply concepts based on current theories of the production and organization of movement to physiotherapy practice, training and/or motor rehabilitation;
2. Apply concepts based on current theories of motor learning to physical therapy practice, training and/or motor rehabilitation; and use of extrinsic information;
3. Apply elements of motor control used to assess movement quality and motor learning in the evaluation and treatment of simulated cases in orthopaedics and neurology.
4. Select and incorporate into practice optimal assessment methods and outcome measures related to motor behavior.

**Course Content:**

1. Introduction: Course content and requirements  
Review of basic anatomy and physiology of the sensorimotor system
2. Motor Control Theories 1: historical perspective, philosophy of motor control, early motor control theories starting from Sherrington (e.g., motor programming, schema theory).
3. Motor Control Theories 2: dynamical approaches/modeling/equilibrium-point theory
4. Motor Control Theories 3 – equilibrium point theory, Controversies in motor control
5. Motor Learning 1 - historical overview and current theories
6. Motor Learning 2 – used of enhanced information – feedback
7. Neural plasticity, compensation and recovery
8. Approaches to clinical evaluation and measurement

**Instructional Methods:** The course combines lectures, group discussions, and small group presentations

**Course Materials:****Required Textbook:**

**Mark L. Latash. Fundamentals of Motor Control, 1<sup>st</sup> Edition. 2012**

Imprint: Academic Press

ISBN: 9780124159563

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**Student Assignments and Evaluation:**

Assignment/evaluation	Description	%
Class participation	Attendance in class (5%), participation in small group discussions (10%) and contributions to Topic Discussions on MyCourses (10%).	25%
Reading assignments - 3 worth 15% each - individual	Students will be assigned research papers to read for which they will prepare a 5 page (1.5 spacing, 12 Times New Roman font) assignment that includes a) a summary of the papers and b) an application of the ideas presented in the paper to physical therapy or sport.	45%
In class presentation - group	Students will present applications of course material (motor control theory and motor learning) to specific patient-based cases.	30%

**Special Requirements for Course Completion and Program Continuation:** In order to pass the course, a grade of at least B- (65%) must be obtained as a total course mark. Please refer to [Section 1.6 Examinations, of the 2022-2023 McGill University Health Sciences Calendar](#) for information on University regulations regarding final examinations and supplementals.

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.

**Plagiarism/Academic Integrity:** McGill University and the Faculty of Medicine 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 Code of Conduct](#).

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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](#).

**Attendance:** Students who have missed more than 10% of small group sessions without prior approval will lose 10% of their total course mark.

**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, except in courses in which acquiring proficiency in a language is one of the objectives.

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).

**Consequences of Not Completing Assignments as Requested:** An individual who does not complete a required assignment and does not have a university recognized reason for deferral would receive a 0 in that portion of the evaluation.

**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.**

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