THE UNIVERSITY OF BRITISH COLUMBIA
SCHOOL OF KINESIOLOGY
COURSE SYLLABUS

Program: Kinesiology	**Term/Year:** September – December 2019
Course #: KIN 357 (3), Section 001	**Course Title:** Laboratory Investigations in Neuromechanical Kinesiology
Day/Time: Tue: 11:00 – 12:30 pm Wed: 10:00 am – 12:00 pm Wed: 12:00 pm – 2:00 pm Wed: 2:00 pm – 4:00 pm	**Location(s):** Tue: Pharmaceutical Sciences 1201 Wed: Osborne Unit #2 G1
Instructor: Dr. Romeo Chua **Office:** 205 Osborne Centre Unit 2 **Lab:** Perceptual-Motor Dynamics Lab **Hours:** during tutorials or by appointment **Phone:** 604-822-1624 **Email:** romeo.chua@ubc.ca	**Teaching Assistant:** Gregg Eschelmuller, BKin **Office:** 128 Osborne Centre Unit 2 **Hours:** during tutorials or by appointment **E-mail:** gregg.eschelmuller@ubc.ca

COURSE DESCRIPTION

Integration and application of laboratory principles and techniques for experimental investigations of topics in Neuromechanical Kinesiology, including motor behaviour, neurophysiology, and biomechanics.

The objective of this lab course is to provide students an opportunity to gain hands-on experience with tools and techniques related to Neuromechanical Kinesiology. Each lab activity is designed around a basic research question drawn from topics within the areas of Neuromechanical Kinesiology.

PREREQUISITES AND/OR COURSE RESTRICTIONS

Enrolment is restricted to students with 3rd year standing or higher standing in Kinesiology.

COURSE FORMAT

The course will consist of one lecture and one 2-hour lab session per week.

Lectures/Discussions will be held in PHRM 1201 classroom.

Labs will be held in the Kinesiology Learning Centre (Osborne Gym G1 – Neuro-Mechanical Kinesiology Section).

Students are expected to attend the lectures and complete all labs.

Course Canvas Site: http://canvas.ubc.ca

GENERAL LEARNING OBJECTIVES

As part of the general learning objectives of this course, students will:

1. Apply skills and techniques essential and applicable to neuromechanical kinesiology and rehabilitation sciences.
2. Demonstrate a conceptual understanding of the elements of the human cognitive, neural, and mechanical systems.
3. Apply knowledge of anatomy, physiology, and psychology to describe human movement and motor control in anatomical, mechanical, and neuro-behavioural terms.
4. Demonstrate knowledge of data collection and analysis techniques related to behavioural response measurements, electromyography, electroencephalography, force, motion analysis, and other methods typically employed in laboratory investigations related to Neuromechanical Kinesiology.
5. Demonstrate personal and social responsibility towards class and laboratory participation.
6. Facilitate active learning, critical thinking, and problem solving skills in the analysis of human movement.

Additional, more detailed, learning objectives will be presented during class.

LABORATORY LECTURE AND ACTIVITIES

The objective of the labs is to provide students an opportunity to gain hands-on experience with tools and techniques related to Neuromechanical Kinesiology. Each lab activity is designed around a basic research question or technique drawn from topics within the areas of motor behaviour, neurophysiology, and biomechanics.

A lecture-discussion and lab handout/assignment is associated with each lab activity. The lecture-discussion is intended to provide some of the background and theory content for the laboratory investigation. The lab is used to carry out the laboratory activity (apparatus set-up, data collection, data analysis). The weekly discussion and lab handouts will provide a background and description of the lab activity, as well as an outline of the type of information (e.g., questions, data, presentation of results, discussion) that students are expected to obtain and complete. No formal reports will be required for the labs. All material covered in the weekly discussions, labs, as well as assigned Lab Readings, will be evaluated in lab and final exams.

Students are expected to understand the concepts and research methodologies involved, the rationale underlying the methodologies, the data collection and analyses, the nature of the data, and the links between background concepts and experiment. Students are responsible for all labs and assignments. There are no make-up labs. If a student misses a lab for any reason, it is their responsibility to know what was done in the lab.

LEARNING MATERIALS

Class notes and lab handouts will be made available through the course website. Students are <u>required</u> to bring these notes and printed copies of lab handouts to class.

A research article accompanies each lab and is intended to provide an example of the application of the lab techniques to a research question in areas related to Neuromechanical Kinesiology. Content from these articles will be covered in the exams.

LEARNING ASSESSMENTS

Assessment 1	**Written Lab Exams (3)**
Format	Short and long answer questions
Details	Students will be required to answer concept, application, methodology, and procedure questions based on the prescribed lectures, laboratory activities, and assigned research articles.
Learning Outcomes	To demonstrate an understanding of the fundamental theoretical principles, laboratory concepts and techniques in the neuromechanical study of human movement.

Assessment 2	**Lab Participation**
Format	Attendance, participation, completion of lab activities and handout
Details	Students are expected to attend, participate, and complete each lab. For each lab, a short assignment that consists of the presentation of lab results and completion of lab questions must be submitted.
Due Date	Assignments will typically be due at the end of the lab session, unless otherwise indicated. No exceptions.
Learning Outcomes	To demonstrate an understanding of fundamental laboratory concepts, techniques, and data collection and presentation.

Grading

Lab Participation:	20%		
Written Exam 1:	25%	**October 8th**	(Labs 1 – 3)
Written Exam 2:	25%	**November 5th**	(Labs 4 – 6)
Written Exam 3:	30%	**Final Exam Period**	(Labs 7 – 9; general lab concepts from all labs)

Exams are based on questions from the lecture-discussions, lab handouts, lab activities, and lab readings. Participation marks are based on attendance, active participation, and completion of the prescribed lab activity and assignment.

Students must write all exams. Failure to write an exam will result in a mark of zero for that exam.

The weightings from lab participation and exams will be used to convert raw marks to a final grade percentage at the completion of the course. There will be no reallocation of assessment weightings.

Exams will not be rescheduled for any reason other than a medical issue or family emergency. Written documentation must be presented in order for the test to be rescheduled. If you do not contact your instructor, you will be given a score of zero on the assessment.

LABORATORY TOPICS AND SCHEDULE

Date	*Topic*	*Activity and Readings*
Sept. 4	Course Overview Orientation to Lab	Lab Orientation, Equipment Overview
Sept. 10	Introduction to Neuromechanical Kinesiology Lab 1 Introduction	Microsoft Excel, LabChart Software, Equipment Tutorials Data Sampling and Signal Processing
Electrophysiological Measures of CNS Responses		
Sept. 11	Reflex Connections and the Human Stretch Reflex	**Lab 1:** Stretch Reflex Horslen BC, et al. (2013). Effects of postural threat on spinal stretch reflexes: evidence for increased muscle sensitivity. *Journal of Neurophysiology*, *110*, 899-906.
Sept. 17	Lab 1 Discussion Lab 2 Introduction	
Sept. 18	Reflex and Voluntary Response Interaction	**Lab 2:** Long-Latency Stretch Reflexes Kurtzer IL, et al. (2008). Long-latency reflexes of the human arm reflect an internal model of limb dynamics. *Current Biology, 18*, 449-453.
Sept. 24	Lab 2 Discussion Lab 3 Introduction	
Motor Preparation of Goal-Directed Movements		
Sept. 25	Control of Rapid Voluntary Movements	**Lab 3:** EMG Patterns of Rapid Movements Valls-Sole J, et al. (1999). Patterned ballistic movements triggered by a startle in healthy humans. *Journal of Physiology*, *516*, 931-938.
Oct. 1	Lab 3 Discussion Lab 4 Introduction	
Oct. 2	Open Lab	Open Lab & Tutorial
Oct. 8	**Lab Exam #1**	**PHRM 1201**

Oct. 9	Anticipatory Postural Responses during Voluntary Movement	**Lab 4:** Anticipatory Postural Responses Hugon M, et al. (1982). Anticipatory postural changes induced by active unloading and comparison with passive unloading in man. *Pflugers Archiv*, 3*93*, 292-296.
Oct. 15	Lab 4 Discussion Lab 5 Introduction	
Sensorimotor Integration		
Oct. 16	Visual-Motor Adaptation	**Lab 5:** Prism Adaptation Rossetti Y, et al. (1998). Prism adaptation to a rightward optical deviation rehabilitates left hemispatial neglect. *Nature*, *395*, 166-169.
Oct. 22	Lab 5 Discussion Lab 6 Introduction	
Oct. 23	Position Sense and Muscle Vibratory Illusions	**Lab 6:** Muscle Vibratory Illusions Inglis JT & Frank JS. (1990). The effect of agonist/antagonist muscle vibration on human position sense. *Experimental Brain Research*, *81*, 573-580.
Oct. 29	Lab 6 Discussion Lab 7 Introduction	
Oct. 30	Open Lab	Open Lab & Tutorial
Nov. 5	**Lab Exam #2**	**PHRM 1201**
Nov. 6	Control of Posture and Balance	**Lab 7:** Posture and Balance Control Carpenter MG, et al. (2001). The influence of postural threat on the control of upright stance. *Experimental Brain Research*, *138*, 210-218.
Cognition, Perception, and Perceptual-Motor Translation		
Nov. 12	Lab 7 Discussion Lab 8 Introduction	
Nov. 13	Stimulus-Response Compatibility	**Lab 8:** S-R Compatibility and Choice RT Kunde W, et al. (2007). Spatial compatibility effects with tool use. *Human Factors*, *49*, 661-670.

Nov. 19	Lab 8 Discussion Lab 9 Introduction	
Nov. 20	Visual-Motor Processing	**Lab 9:** Subliminal Visual Processing Binsted G, et al. (2007). Visuomotor system uses target features unavailable to conscious awareness. *Proceedings of the National Academy of Sciences*, *104*, 12669-12672.
Nov. 26	Lab 9 Discussion	
Nov. 27	Open Lab	Open Lab & Tutorial
December Exam Period	**Final Exam**	**TBA**

UNIVERSITY POLICIES

Regular attendance is expected of students in all their classes (including lectures, laboratories, tutorials, seminars, etc.). Students who neglect their academic work and assignments may be excluded from the final examinations. Students who are unavoidably absent because of illness or disability should report to their instructors on return to classes.

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions.

Details of the policies and how to access support are available on the UBC Senate website (https://senate.ubc.ca/policies-resources-support-student-success).

IMPORTANT DATES

Last date for withdrawal without a W on your transcript: September 17, 2019.

Last date for withdrawal with a W instead of an F on your transcript: October 11, 2019

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