



Land Acknowledgement

We respectfully acknowledge the Syilx Okanagan Nation and their peoples, in whose traditional, ancestral, unceded territory UBC Okanagan is situated.

HES 488: Cortical Control of Movement

Faculty: Faculty of Health and Social Development

Department: Health and Exercise Sciences

Instructor: Dr. Brian Dalton

Instructor Email: brian.dalton@ubc.ca

Duration: Term 1 Winter 2024

Delivery Modality: In-Person

Course Location: EME 1151

Course Days: Monday/Wednesday

Class Hours: 12:30 – 14:00

Office hours: By appointment

Course Description

Cortical events associated with sensation and motor planning associated with goal-directed movement. Particular focus on plasticity associated with disease and injury. Formerly offered as HMKCN 413. Credit will be granted for only one of HES 488 or HMKCN 413. [3-0-0]

Prerequisite: Either (a) HES 202 or (b) HMKCN 202; and either (a) HES 240 or (b) HMKCN 206; and either (a) HES 340 or (b) HMKCN 205.

Course Structure

All course activities are designed for in-person delivery with some asynchronous activities (e.g., videos, readings, assignments). The course is structured with an emphasis on student engagement (e.g., discussion, presentations and interaction) in combination with traditional-based learning mediums (e.g., exams and written assignments). Course content will be available via readings and online videos. Application of the course concepts will occur during active discussion sessions during scheduled class times.

All course activities will be delivered in-person and materials will be delivered online, which will consist of a mix of asynchronous and synchronous components. On the Friday morning preceding each week, course content will be posted to Canvas via brief (10-15 min) lecture recordings and/or assigned readings. Weekly scheduled course meetings, will emphasize student engagement and participation via synchronous in-person discussions involving small and large groups that will be facilitated by the instructor.

Course Overview, Content and Objectives

The overall objective of this course is to provide a scientific foundation of the cortical control of movement. The course will emphasize the study of movement disorders and intervention strategies through the integration and application of neurophysiological principles.

In this course, we will discuss the clinical manifestations and underlying physiological mechanisms of selected movement disorders as it relates to the cortex and central nervous system. There will be an emphasis on the role of scientific experiment in diagnostic and treatment techniques.

Canvas:

The majority of course information will be conveyed via the course Canvas site. Please review default Canvas notification settings. In addition to this syllabus, such things as important announcements, readings, handouts, and other course-related materials will be available via Canvas.

Learning Outcomes or Objectives (LOs)

Upon successful completion of this course, students will be able to...

1	Explain the anatomy and physiology within the sensorimotor system that is important for human movement
2	Identify the neuromuscular physiological origins of a number of different movement disorders
3	Distinguish and determine the link between the physiology of specific movement disorders and the motor symptoms experienced
4	Evaluate and discuss the efficacy of rehabilitation/intervention strategies to ameliorate or treat certain movement disorders, including the physiological mechanisms underlying the strategies
5	Evaluate primary literature related to the mechanisms and rehabilitation/intervention strategies of specific movement disorders and formulate a recommendation on the effectiveness of specific intervention strategies

Methods of Assessment

Description of Assessment (Assignment/Exam + % worth)	Learning outcome(s) being assessed
Participation and Professionalism (10%)	LO1-5
Reading and In-class Assignments (10%)	LO4-5
Mid-Term Exam 1 (15%)	LO1
Mid-Term Exam 2 (15%)	LO2-3
Written Project (25%)	LO1-5
Oral Presentation and Discussion (25%)	LO1-5

Course Schedule

Week/Date	Topic	Readings
Week 1 Sept 4	Week 1-1: Introduction	Review HES 202 notes
Week 2 Sept 9	Week 2-1: Neuromuscular physiology overview	Week 2-1: Review HES 202 notes
Sept 11	Week 2-2: Critical evaluation of media and scientific reports	Week 2-2: Woloshin & Schwartz, 2006; Uman, 2011
Week 3 Sept 16	Week 3-1: Brain areas involved in movement disorders - Basal Ganglia	Week 3-1: Chapter 43 of Kandel ER et al. Principles of Neural Science, 2013.
Sept 18	Week 3-2: Brain areas involved in movement disorders - Cerebellum	Week 3-2: Chapter 42 of Kandel ER et al. Principles of Neural Science, 2013.
Week 4 Sept 23	Week 4-1: Brain areas involved in movement disorders - Vestibular system Partners and presentation date selection	Wardman DL, Fitzpatrick RC. Sensorimotor Control of Movement and Posture, 2002. Lam CK et al. Brain and Behavior, 2017. Thompson TL, Amedee R. The Ochsner Journal, 2009.
Sept 25	Week 4-2: Brain areas involved in movement disorders - Vestibular system Reading Assignment Due	
Week 5 Sept 30	Week 5-1: National Day of Truth and Reconciliation (No Class)	
Oct 2	Week 5-2: Brain areas involved in movement disorders - Motor cortex	Week 5-2: Daniel Wolpert: The real reason we have brains
Week 6 Oct 7	Week 6-1: Mid-term Exam 1	Week 6-1: Review course material

Oct 9	Week 6-2: Guest Lecture - Cannabis and motor control	Week 6-2: TBD
Week 7 Oct 14	Week 7-1: Thanksgiving Day (No Class)	
Oct 16	Week 7-2: Excitotoxicity	Week 7-2: Velasco M et al. J Neurol Neurosci, 2017.
Week 8 Oct 21	Week 8-1: Peripheral Neuropathy Reading Assignment Due	Week 8-1: Martyn CN, Hughes RAC. Neuroepidemiology, 1997. Sun Y et al. Acta Neurologica, 2005. Watanabe T. J Neurological Sci, 1994.
Oct 23	Week 8-2: Project preparation - Neurophysiological description of disorder In-class assignment due	Week 8-2: Readings pertaining to your research topic
Week 9 Oct 28	Week 9-1: Spasticity Reading Assignment Due	Week 9-1: Graham LA. Age and ageing, 2013.
Oct 30	Week 9-2: Tremor Reading Assignment Due	Week 9-2: Jankovic J, Fahn S. Annals of internal medicine, 1980.
Week 10 Nov 4	Week 10-1: Project preparation - Evaluation of intervention In-class assignment due	Week 10-1: Readings pertaining to your research topic
Nov 6	Week 10-2: Mid-term Exam 2	Week 10-2: Review course material
Week 11 Nov 11	Week 11-1: Remembrance Day (No Class)	
Nov 13	Week 11-2: Reading Week (No Class)	
Week 12 Nov 18	Week 12-1: Student-Led Topic 1 Student-Led Topic 2 Reading Assignment Due	Week 12-1: TBD – provided by students

Nov 20	Peer Evaluation Due Week 12-2: Student-Led Topic 3 Student-Led Topic 4 Reading Assignment Due Peer Evaluation Due	Week 12-2: TBD – provided by students
Week 13 Nov 25	Week 13-1: Student-Led Topic 5 Student-Led Topic 6 Reading Assignment Due Peer Evaluation Due	Week 13-1: TBD – provided by students
Nov 27	Week 13-2: Student-Led Topic 7 Student-Led Topic 8 Reading Assignment Due Peer Evaluation Due	Week 13-2: TBD – provided by students
Week 14 Dec 2	Week 14-1: Student-Led Topic 9 Student-Led Topic 10 Reading Assignment Due Peer Evaluation Due	Week 14-1: TBD – provided by students
Dec 4	Week 14-2: Student-Led Topic 11 Student-Led Topic 12 Reading Assignment Due Peer Evaluation Due	Week 14-2: TBD – provided by students

Learning Materials

All learning materials will be uploaded to Canvas and available via the course's Canvas website.

Other Course Policies:

Late policy

Assignments are due at the specified due date and time indicated on the course outline or Canvas; after that, unless specified by your instructor, the assignment will be considered late. It is expected that you will budget your time accordingly to avoid work overload and manage personal issues to meet academic performance requirements. Be aware of when your work is due as it is common to have several exams and assignments due on the same day or within the same week. If an assignment is submitted greater than 24 hours late, 25% will be deducted from the grade and it will not be accepted after 7 days.

Throughout the semester students will be granted 4 "freebies" for all minor assessments (e.g., reading assignments, peer evaluations, participation).

Missed exam policy

A make-up exam will be provided for any missed mid-term exam owing to a reasonable circumstance.

The make-up exam will be written outside of class time at a specified date and time.

A total of four "freebies" will be granted throughout the semester for any missed/late reading assignments or peer evaluations.

UBC Values

UBC creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada, and the world. UBC's core values are excellence, integrity, respect, academic freedom, and accountability.

Policies and Regulations

Visit [UBC Okanagan's Academic Calendar](#) for a list of campus-wide regulations and policies, as well as [term dates and deadlines](#).

Academic Integrity

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating usually result in a failing grade or mark of zero on the assignment or in the course. Careful records are kept to monitor and prevent recidivism.

A more detailed description of academic integrity, including the University's policies and procedures, may be found in the [Academic Calendar](#).

Academic Misconduct

The academic enterprise is founded on honesty, civility, and integrity. Violations of academic integrity (i.e., [academic misconduct](#)) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred for consideration for academic discipline. Careful records are kept to monitor and prevent recurrences. Any instance of cheating or taking credit for someone else's work, whether intentionally or unintentionally, can and often will result in at minimum a grade of zero for the assignment, and these cases will be reported to the Head of the Department and Associate Dean Academic of the Faculty.

Student Service Resources:

Walk-In Well-Being Clinic

The Walk-In Well-Being clinic offers no-fee, brief, single-session psychological services. Sessions are led by a doctoral student in clinical psychology and supervised by a registered psychologist (UBCO Faculty member). Clinicians can provide support with stress management, sleep, self-care, depression, anxiety, interpersonal issues, substance misuse, coping with academic demands/stressors, and provide options for connecting to additional resources. Virtual or in-person sessions are available at the UBCO Psychology Clinic, located in ASC 167 with or without an appointment, on Tuesdays and Thursdays between 10 am and 3 pm from September to June, excluding campus closures.

UNC 337 250.807.8421 (ext. 1)

Email: ipc.ok@ubc.ca

Web: <https://psych.ok.ubc.ca/psychology-clinic/walk-in-wellness/>

Student Supports, Resources & Campus Services

Visit the [Student Support and Resources page](#) to find one-on-one help or explore resources to support your experience at UBC Okanagan, as well as many other campus services available to all students.

Advising Options

Visit the [Advising Options page](#) to find out about the variety of advising options available to students including but not limited to academic, career and accessibility.

Safewalk

Don't want to walk alone at night? Not too sure how to get somewhere on campus? Call Safewalk at **250-807-8076**.

Web: www.security.ok.ubc.ca