

The University of British Columbia
School of Kinesiology

Kinesiology 500D - 2018

The Neurophysiology of Human Movement Control

Instructor: Dr. J. Timothy Inglis

Phone: 604 822-1626

Office: Room 218

War Memorial Gym

Email: tim.inglis@ubc.ca

Location and Time:

Tues: 1:00 pm to 3:00 pm, War Memorial Gym, Room 100

Summary

An examination of the neuroanatomical and functional neurophysiological processes involved in the sensory and motor control of voluntary movement, from a perspective focusing on Proprioception and Kinesthesia. Emphasis is placed on peer teaching during presentations, a critical analysis of the pertinent scientific literature, as well as the writing of a NSERC formatted research grant or Directed term paper of similar length. This is a small seminar based course combining graduate and undergraduate student instruction.

Global Learning Objectives

1. To explore the basic neurophysiological processes underlying the control of Human Kinesthesia.
2. To explore the functional roles of the various peripheral and central nervous system (CNS) structures known to be involved in Kinesthesia.
3. To further develop the presentation skills of the student, to advance critical thinking and evaluation of the current neurophysiological literature, and to introduce the student to drafting a research grant.

Course Learning Objectives:

By the end of this course, you will be expected to:

- 1) **Think critically about the neurophysiological processes as they pertain to the control of Human movement.**
- 2) **Be able to discuss critically the current scientific literature that uses neurophysiological techniques discussed within the lectures.**
- 3) **Demonstrate a professional behaviour within a small seminar setting, and toward class participation and involvement.**
- 4) **To work on oral presentation skills, and develop writing skills in an area of interest to the student within the cognate area of this course.**

Course Evaluation

A. Grant Proposal/Term Paper:

Each graduate student will be required to draft *Either*:

- 1) A 5-page, single spaced NSERC grant that is appropriate for this course and it's content, with a budget page, as well as a 1-page plan for training of Highly Qualified Personnel (HQP – i.e. trainees). *Example handout of an NSERC format grant will be provided by the instructor*.
- 2) A 20-page (including references) term paper focused on one specific topical area appropriate for this course and it's content, that includes an introduction to the literature in that area, a proposed research question, and a brief outline of the methodology that could be used to test the theory outlined in this paper.

Value: - 30% (Due, Thurs March 29th, 4:00 pm, 2018.)

B. Review Article Teaching Presentations:

Content presentation of assigned sections from the target Review Journal Article. The duration of and total number of the student presentations will depend on the total number of students enrolled in the combined KIN 489T/KIN 500D classes. See below for presentation sections.

NOTE: Students are required to **Present** (PowerPoint), **review content & Lead** discussion on material. This includes going to the original articles cited in the review to accent the work presented in each particular subsection of the review article. A projector and computer will be available for presentation use by the students if required.

Value: - Total 40%

C. Research Grant/ Term Paper Presentation:

Students will be required to do a 30-minute summary presentation of their grant (minus budget) or term paper.

Value: - 20% -- Tues April 3rd, 1:00 pm, 2018.

NOTE: If the number of presentations extends beyond the available time, then a second presentation date will be determined, and will likely occur during the normal final examination window for term 2.

D. Participation:

Students will be evaluated on a 10-point scale for the extent of their participation in discussions during the presentations of the term papers/grants and of the review article presentations.

Value: - 10%

Required Reading:

[Uwe Proske & Simon Gandevia \(2012\) The proprioceptive senses: Their roles in signaling body shape, body position and movement, and muscle force. Physiological Reviews 92: 1651-1697.](#)

Outline of Lectured Topics

Week #1 (Jan. 9) – Introduction to course. Assignments. Introduction.

Week #2 (Jan. 16) – Preparation week.

Week #3 (Jan. 23) – I. A/B Kinesthetic Sensors (pages 1651-1658).

Week #4 (Jan. 30) – II. C/D/E Kinesthetic Sensors (pages 1658-1661).

Week #5 (Feb. 6) – III. What do Proprioceptors signal? (1661-1665).

Week #6 (Feb. 13) - IV. Body Schemas and Images. (1665-1671).

Week #7 (Feb. 20) — Reading week – class cancelled.

Week #8 (Feb. 27) – V. Effort, Force, and Heaviness. (1671-1677).

Weeks #9 (March 6) – VI. Proprioception and Exercise (1677-1682).

Weeks #10 (March 13) – VII/VIII. Proprioception “Plus” (1682-1686).

Weeks #11 (March 20) – IX. Wrapping it up/concluding remarks (1686-)

Week #12 (March 27) – Preparation week for Paper/Grant – NO Class.

Week #13 (April 3) –Grant /term paper Presentations.