THE UNIVERSITY OF BRITISH COLUMBIA

School of Kinesiology

Course Outline

Program: Kinesiology **Course #: KIN 568**, Section 001 **Day/Time:** Tuesdays 12:30pm – 3:30pm **Instructor:** Dr. Romeo Chua **Phone:** 604-822-1624 **Email:** romeo.chua@ubc.ca	**Term/Year:** Jan – April 2024 **Course Title:** Seminar in Human Sensorimotor Control **Location:** Osborne Unit 2, 125G3

Course Description:

The focus of this seminar is upon *mechanisms and principles in human sensorimotor control* as well as the research methods commonly used in sensorimotor control research. KIN 568 draws primarily upon the frameworks offered by the fields of human motor behaviour, cognitive neuroscience, neuroscience, and experimental psychology.

It is assumed and expected that students have an undergraduate background in motor control and learning or related areas in cognitive neuroscience, neurophysiology, or experimental psychology.

Emphasis is placed on a critical analysis of the scientific literature, seminar presentations, and on the development of a research proposal or literature review.

The themes for KIN 568 are ***Sensorimotor Transformations in Human Motor Control*** *and* ***Computational Principles and Approaches to Human Sensorimotor Control***. We will be covering research issues pertaining to the sensorimotor neuroscience of action – e.g., the reafference principle, inverse and forward models, sensorimotor adaptation, sensorimotor transformations, sensory prediction, error correction, multi-sensory integration, motor learning and adaptation, etc.

Objectives:

1. Review historical and recent research on issues pertaining to human sensorimotor control.
2. Develop the background and tools to critically analyze and assess the research.
3. Allow students to present their ideas on a topic and have these ideas subjected to evaluation and feedback by their peers.
4. Develop a study proposal for an in-depth investigation into a specific research topic or a literature review.

Required Readings:

1st Set of Required Readings for January 9th: These reviews are intended to provide a background and non-exhaustive sample of the research themes and concepts for the course. Students will facilitate discussions of the topics **within** these review articles.

1. Kim HE, Avraham G & Ivry RB (2021). The psychology of reaching: Action selection, movement implementation, and sensorimotor learning. *Annual Review of Psychology*, *72*, 61-95.
2. Proske U & Gandevia SC (2012). The proprioceptive senses: Their roles in signaling body shape, boy position and movement, and muscle force. *Physiological Reviews*, 92, 1651-1697.
3. Scott SH (2016). A functional taxonomy of bottom-up sensory feedback processing for motor actions. *Trends in Neurosciences*, *39*, 512-526.
4. Shadmehr R, Smith MA & Krakauer JW (2010). Error correction, sensory prediction, and adaptation in motor control. *Annual Review of Neurocience*, *33*, 89-108.

Additional readings will consist of research articles from peer-reviewed journals.

Research and presentation topics must be selected from the research themes covered in the 1st set of readings.

Seminar Presentations:

Students will lead seminar presentations on an empirical research article. The topic of the article **must fit within the research themes** and topics contained within the 1st set of required readings above. Presentations must be in PowerPoint or similar presentation software.

The presentations of the research articles should provide a clear overview of the research question, relevant background, an overview of the research methods and analysis, the main results, and primary conclusions of the study.

Students will present on alternate weeks. Students not presenting on a given week are expected to read the research articles and are expected to engage in post-presentation discussions.

First Class (January 9th)

For the first class, students are expected to have read the required reviews above. Students are expected to select a research article (e.g., from the reference lists) that highlights a potential area of research interest and prepare a 5-minute presentation (PowerPoint) for the class. The presentation should provide an overview of the article and the research area of interest.

Course Evaluation:

A. Presentations: 50%

Seminar Presentations: Critically review and present current empirical research. Students will present research based on an empirically based article and facilitate discussion. 40%

Presentation of Research Proposal or Review: Students will present an overview of their final research proposal or literature review. 10%

Presentations are expected to be in PowerPoint and delivered in person.

B. Research Proposal or Review: 40% (Due Date: April 26, 2024)

A document that provides a detailed proposal for a research study or a review of the research literature on a given topic.

The research proposal includes a review of relevant literature, a clear statement and rationale for the purpose of the study, a clear hypothesis, a detailed description of the study methods and procedures, as well as hypothesized results and a discussion of the implications of potential results of the proposed study.

The review is a detailed survey of the research literature on a specific topic and should include a clear outline of the topic and delineation of the scope of the review.

Maximum: 20 pages (excluding references, figures, tables etc.), double-spaced, in APA format.

C. Participation: 10%

Students will be evaluated on a 10-point scale for class participation.