YORK UNIVERSITY
KINESIOLOGY AND HEALTH SCIENCE
AS/SC KINE 4505 3.0 Neurophysiology of Movement in Health and Disease
Fall 2022: IN-PERSON DELIVERY

Course learning objectives: The purpose of this course is to provide students with an overview of current neurophysiological concepts in motor control. Students will study the neurophysiological principles underlying human movement disorders**.**

Specific learning objectives:

- *be able to describe how sensory information gets into the brain, and how it is processed for movement control*
- *understand and critically examine recent approaches to the treatment of brain damage and disease*
- *demonstrate the ability to apply theory to practice in the context of clinical case studies*
- *develop the ability to discuss and write about current movement disorder research*

Prerequisites:	AS/SC/KINE 3020 Skilled Performance and Motor Learning **or** AS/SC/KINE 3011 Human Physiology I **or** permission of the course director
Course Director:	Dr. Lauren Sergio, lsergio@yorku.ca, 2032 Sherman Building Office hours: By appointment/at end of Thursday class *Course Website: This course is run through* eClass
Lectures:	Tuesday/Thursday 10h00 -11h20, Sept. 8 to Dec. 6,2022 Location: Accolade West, Room 304 Note: If needed, delivery via Zoom, link on eClass. Accommodations in place for those who cannot be on campus on a given day for in-person classes.
Required Textbook:	Purves et al. Neuroscience, 3rd Ed. or later, Sinauer, MA, USA

Course Evaluation:		
	Participation (in class – clinical cases, n=8)	24%
	Clinical Poster project, see schedule for due date.	12%
	Term Paper Outline, see schedule for due date.	4%
	Term Paper, see schedule for due date.	20%
	In-class quizzes on lectures (4 total, see schedule)	40%

*Note: Any extensions for projects must be approved by the instructor **PRIOR** to the due date. Late assignments will be penalised 2% per day up to 10% max reduction.*

***IN CASE OF RETURN TO REMOTE CLASS DELIVERY:** Clinical case review will be via zoom and a forum for posting clinical case material will be made available; quizzes will be held remotely if there is a return to remote course delivery mandated by the University.*

***ACCOMODATION IF UNABLE TO BE ON CAMPUS THE DAY OF THE CLASS:** If you are unable to make a particular clinical review class, you may write a 1 page summary of the article addressing the questions discussed in class (contact me for the discussion points). If you miss a quiz, you can write a make-up during the final exam period (date TBD).*

***Structure of class** (TIMES ARE APPROXIMATE, MAY VARY DEPENDING ON TOPIC):*
Clinical case class (Tuesdays F23): 10h00-10h15: lecture q&a, 10h15-10h45 clinical case breakout groups 10h45-11h20 clinical case discussion. Lecture class (Thursdays F23):10h00-11h20: lecture, q&a, individual meetings

INSTRUCTIONS FOR ESSAY OPTION

- Papers handed in late will be penalized 2**% per day up to 10% max.**
- **See class schedule for due date (below)**
- Topics listed below are suggestions only. You are free to come up with your own topic to be cleared by the instructor. It needs to contain the themes of neuroscience *and* movement.

ESSAY OUTLINE (4%): Please provide a 1 page (max) double-spaced outline of your paper including a brief introduction to your topic and what aspects of the topic your essay will cover. It can be bullet point. Last day to submit is listed below on the class schedule (but I'll take them earlier) to be returned a week later with feedback. You can submit this as an email attachment. Make sure to put '4505 essay outline' in the subject line.

Assignment Submission:
All course essays must be submitted as an e-mail attachment to lsergio@yorku.ca.

You are **also required to carry out one of the following:

Option 1 - TurnItIn: You are required to submit your final paper into TurnItIn (on eClass) by the same date the assignment is due.

Option 2 - Alternative to TurnItIn: If you do not want to use Turnitin, please let the course director know in advance. You will be required to submit written a report on how you completed your essay (required contents below), along with detailed annotated bibliography. The report and bibliography must be submitted with your assignment when it is due. You will also email an electronic copy of each report and bibliography (with hyperlinked URLs in it) to the course director. You may also be asked to take an oral examination on the topic of your written assignments directed at issues of originality.
The written report must contain the following information, as well as anything else you consider useful to the course director on the issue of academic integrity:

1. A list of the documents and other sources you consulted to understand your topic, along with the dates you first used each of them.
2. An explanation of how those documents and sources led you to the other documents and sources you used.
3. An explanation of which of the sources you used had the most influence on your understanding of the topic of your assignment, and how you used them.

The following are some ***suggestions for topics***: (you are free to come up with another, it must involve MOVEMENT and neurophysiology).

1. Surgical approaches to the treatment of Parkinson's disease.
2. Motor rehabilitation following stroke.
3. Current research on recovery from spinal cord injury.
4. Current research in cerebellar disorders.
5. Current research in basal ganglia disorders (e.g. Parkinson's/Huntington's disease).
6. Apraxia.
7. Diseases of the neuromuscular junction.
8. Amyotrophic lateral sclerosis.
9. The role of the cerebellum in motor learning.
10. The effects of deafferentation on movement.
11. Plasticity following stroke/spinal cord injury/traumatic brain injury.
12. Potential of stem cell therapies for neurological disorders.
13. Motor recovery after stroke in children.
14. Sensorimotor integration in the parietal lobe.

15. Sensory gating mechanisms.
16. Attention and motor control.
17. Traumatic brain injury.
18. Multiple Sclerosis.
19. Neuroprosthetics/neuromuscular prosthetics
20. Movement disorders associated with dementia

In your paper, make sure you discuss specific neurophysiological mechanisms affected by the disorder (if applicable) or involved in the sensorimotor process.

The paper should comprise a general review of the area (from either a review article or a published book) and a discussion of current research on the topic, using at least four articles from **peer-reviewed journals**. At least three of these articles must be original research papers (i.e., not opinion or review pieces). You will be assessed on the thoroughness with which you have researched the topic, the organization of the paper, the cogency of your arguments, and your writing style.

Papers may be a **maximum** of 10 typewritten pages, double-spaced, with 1" margins and 12 pt font, ****NOT**** **including references**.

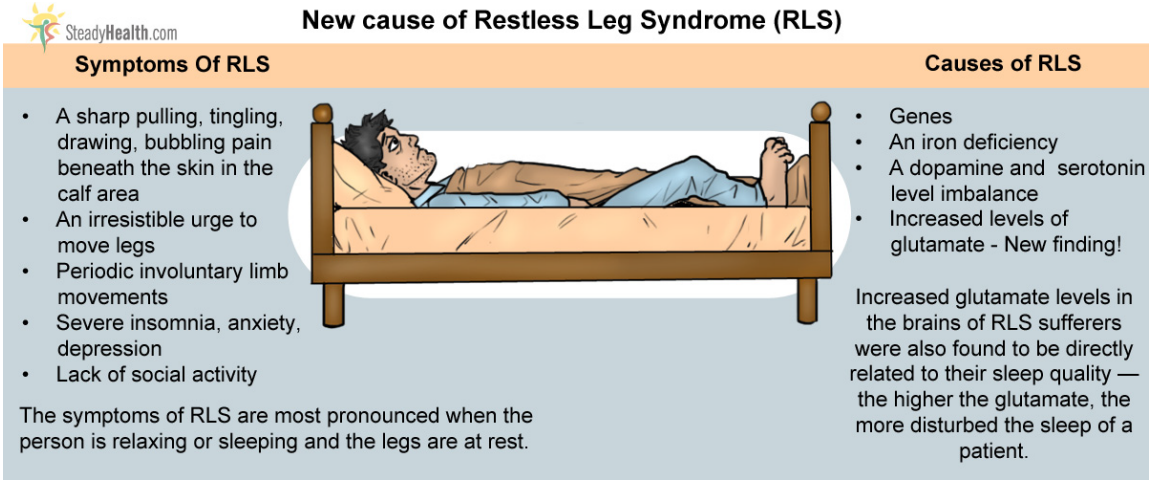
Follow the American Psychological Association reference system, and **include an APA style <u>abstract</u>** at the beginning of the paper.

THE POSTER TOPIC AND THE ESSAY TOPIC MUST BE *DIFFERENT*..

INSTRUCTIONS FOR CLINICAL POSTER PROJECT

In this project, you need to design an informative poster, similar to one you may see in a physician's office. You may use any image processing software you would like (powerpoint, canveo, pixlr, etc.). The poster must explain ***concisely*** the nature of the disease or the condition in a few points, signs that may be present, and potential treatments that may be available. Your poster will be evaluated on 1) accuracy of the material, 2) brevity of the presentation, and 3) artistic quality of the design (not too busy, not too many design elements, nice balance of text and images, presented in a way that can be taken in and understood by potential person affected by the disorder!)

Example (this one is a bit light on images, but you get the idea):



RE-EVALUATION POLICY

During the term:

Any requests for remarking of assignments or quizzes must be received by the course instructor within 7 days of the item's mark being posted, along with the "Evaluation item remark request" form, which can be found on the course website. Please note that your mark may be ***raised, lowered, or confirmed.***

Re-appraisal of a final grade:

Any requests for re-appraisal of a final mark must be received by the course instructors within 7 days of the final grade posting, along with the "Evaluation item remark request" form, which can be found on the course website. Please note that your mark may be ***raised, lowered, or confirmed.*** If the result is still unsatisfactory, requests for a reappraisal of the final grade for a completed course are the responsibility of the Undergraduate Director. You must submit in writing a formal request for a **final grade reappraisal** to the KINE undergraduate Office. The 'Reappraisal of Final Grades' form can be picked up at the KINE Undergraduate Office.
For further details: www.registrar.yorku.ca/policies/grade.htm

IMPORTANT GENERAL COURSE INFORMATION FOR STUDENTS

All students are expected to familiarize themselves with the following information, available on the Senate Committee on Academic Standards, Curriculum & Pedagogy webpage (Policies, procedures, and regulations) - **https://secretariat-policies.info.yorku.ca/**

- Senate Policy on Academic Honesty and the Academic Integrity Website
- Course requirement accommodation for students with disabilities, including physical, medical, systemic, learning and psychiatric disabilities
- Student Conduct Standards
- Religious Observance Accommodation

In this course, we strive to maintain academic integrity to the highest extent possible. Please familiarize yourself with the meaning of academic integrity by completing SPARK's Academic Integrity module at the beginning of the course. Breaches of academic integrity range from cheating (i.e., the improper crediting of another's work, the representation of another's ideas as your own, etc.) to aiding and abetting (helping someone else to cheat). All breaches in this course will be reported to the appropriate university authorities, and can be punishable according to the Senate Policy on Academic Honesty.

Faculty of Health Academic Honestly resources: https://www.yorku.ca/health/academic-honesty-3/

To promote academic integrity in this course, students will be normally required to submit their written assignments to Turnitin for a review of textual similarity and the detection of possible plagiarism. In so doing, students will allow their material to be included as source documents in the Turnitin.com reference database, where they will be used only for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin service are described on the Turnitin.com website.

TECHNOLOGY REQUIREMENT FOR THIS COURSE

This course will be run through eClass and may use zoom. It is designed as an in-person class, which may have a ***synchronous*** component if required. Thus, you are expected to be present during class time, or able to be present/logged on for zoom components. A camera is not required if we are interacting remotely, you may interact during group and class discussions via the chat.

STUDENT SUPPORT RESOURCES

Calumet and Stong Colleges' Student Success Programming:

Calumet and Stong Colleges aim to support the success of Faculty of Health students through a variety of **free programs** throughout their university career:

- Orientation helps new students transition into university, discover campus resources, and establish social and academic networks.
- Peer Mentoring connects well-trained upper-year students with first year and transfer students to help them transition into university.
- Course Representative Program supports the academic success and resourcefulness of students in core program courses through in-class announcements.
- Peer-Assisted Study Sessions (PASS) involve upper-level academically successful and well-trained students who facilitate study sessions in courses that are historically challenging.
- Peer Tutoring offers one-on-one academic support by well-trained Peer Tutors.
- Please connect with your Course Director about any specific academic resources for this class.
- Calumet and Stong Colleges also support students' Health & Wellness, leadership and professional skills development, student/community engagement and wellbeing, Career Exploration, Indigenous Circle, awards and recognition, and provide opportunities to students to work or volunteer.
- For additional resources/information about Calumet and Stong Colleges' Student Success Programs, please consult our websites (Calumet College; Stong College), email scchelp@yorku.ca, and/or follow us on Instagram (Calumet College; Stong College), Facebook (Calumet College; Stong College) and LinkedIn

CLASS SCHEDULE - Fall 2023 (subject to revision)

September 8	Introduction, course overview/design, Neuroanatomy review Readings: CH. 1 textbook; Show and tell group activity
September 13	Clinical case 1: *Hydrocephalus*
September 15	Topic 2:Neurophysiology Review. Reading: CH. 2
September 20	Clinical case 2: *Seizure disorder*
September 22	Topic 3,4:Synaptic Communication, Neurotransmitters Reading: CH. 5,6
September 27	**Quiz 1 on topics 1-4**
September 29	Topic 5:Somatosensory System Reading: CH. 8
Oct 4	Clinical case 3: *Phantom limb pain*
October 6	Topic 6:Spinal circuitry & brainstem pathways Readings: CH. 15, pp. 371-387
October 18	Clinical case 4: *Spinal cord injury treatment*
October 20	Topic 7: Organization of the Motor System Readings: CH. 15, pp. 389-392 Topic 8:Spinal cord injury and Motor Neuron disorders Readings: CH. 16, pp. 393-408 / Lundy-Ekman PP. 284-296
October 25	**Quiz 2 on topics 4-8**
October 27	Topic 9:Basal Ganglia – Structure, Function, Disorders
November 1	Clinical case 5: *Cerebellar ataxia*
November 3	Topic 10:Cerebellum – Structure, Function, Disorders Readings: CH. 17,18
November 8	Clinical case 6: *Obsessive compulsive disorder*
November 10	Topic 11:Parietal dysfunction: Optic Ataxia and neglect syndrome Reading: Parietal syndrome chapter (provided) Topic 12:Premotor cortex Readings: CH. 16 pp. 408-416; mirror neuron video
	Last day to drop course without receiving a grade: November 11, 2022
November 15	**Quiz 3 on topics 9-12**
November 17	Topic 13:Cortical networks for Movement

November 22	Clinical case 7: *Disconnection syndrome*
November 24	Topic 14:Stroke – Acute, Reading: Appendix B: pp. 764-767
November 29	Clinical case 8: *Post-stroke aphasia*
December 1	Topic 15&16:Stroke – Recovery, Rehabilitation & Neuroplasticity Reading: Reading: CH. 24, constraint-induced therapy video
December 6	**Quiz 4, topics 13-16**

DUE DATES FOR ASSIGNMENTS

Poster Due Nov 4, 5:00 pm
Term Paper Outline Due Friday November 11, 5:00 pm via email
Term Paper Due Friday November 25, 5:00 pm to Turnitin on eClass
Final exam (if required) during exam period