

**YORK UNIVERSITY
KINESIOLOGY AND HEALTH SCIENCE**

**AS/SC KINE 4505 3.0 Neurophysiology of Movement in Health and Disease
Fall 2016**

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's 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
357 Bethune College (mail room)
Office: 2032 Sherman Health Science Research Building
736-2100, Ext. 33641
lsergio@yorku.ca

Course Website: This course is run through Moodle

Lectures: Tues/Thurs 1:00 -2:30, TEL 1005

Required Textbook: Purves et al. Neuroscience, 3rd Ed. or later, Sinauer, MA, USA
(see 'readings' section in Moodle)

Course Evaluation:

| | | |
|---|---------------------------------|-----|
| Mid-term Exam | Tuesday, October 18, in class | 35% |
| Term Paper | Friday November 25, by 5 pm* | 30% |
| OR Class Presentation | | |
| *This date/time applies to the turnitin submission as well. | | |
| Final Exam | TBA (exam period starts Dec. 7) | 35% |
| The final exam is not cumulative | | |

Note A: Any extensions for projects must be approved by the instructor *prior to the due date*.
Late reports/assignments will be penalised (**10% per day**).

Note B: The procedure for missed in-class test is as follows:

- Anyone missing the midterm for a legitimate medical reason will write a make-up exam prior to Nov. 4th (last day to drop course is November 11th).
- Specific arrangements must be made with the course director by Friday October 21st, at the latest.
- A doctor's note or other official documentation is required for a missed test. Documents are verified with the physician's office.

INSTRUCTIONS FOR ESSAY OPTION

- The deadline for handing in the term paper is **Friday November 25, 2016, 5:00pm**.
- Papers handed in late will be penalized **10% per day**.
- 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.

Assignment Submission:

All course essays must be submitted in hard paper copy *or* as an e-mail attachment.

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 moodle) 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:

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 (i.e. Parkinson's/Huntington's disease).
6. Apraxia.
7. Diseases of the neuromuscular junction – myasthenia gravis.
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

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 three articles from **peer-reviewed journals**. At least two 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.

Also, you must cite **at least** 3 original research articles in the discussion of your topic.

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 abstract at the beginning of the paper.

****** You have an opportunity to receive feedback on a draft of a 1 page double-spaced introduction to your paper. Last day to submit is November 3rd, to be returned by November 10th. You can submit this either in a hard copy or as an email attachment.

INSTRUCTIONS FOR CLASS PRESENTATION OPTION

- You have the option to do a 15 minute presentation to the class on your research topic in lieu of the term paper.
- If you intend to select this option you must inform the instructor by **November 3rd** at the latest. Topics for presentation must also be cleared by the course instructor at this time.
- There are a limited number of presentation times (5). Presentation times will be filled on a ***first-come, first-serve basis***.
- Presentations will be scheduled for the end of term at the beginning of class time.
- Topics listed above are suggestions only. You are free to come up with your own topic to be cleared by the instructor.
- Presenters must provide the class with a 1-2 page summary of their presentation, exam questions will be given based on these summaries. A copy of the powerpoint file (or a pdf of the slides) and a list of references must be submitted to the instructor on the day of your presentation.

Presentations are to be lecture style, approximately 15 minutes in length and will be followed by a question and discussion period (approximately 5 minutes).

As with the paper, make sure you discuss specific neurophysiological mechanisms affected by the disorder or involved in the sensorimotor process that you are presenting.

Also, you must use at least 3 original research articles in the discussion of your topic.

****** You have an opportunity to receive feedback on a draft of the outline for your presentation. Last day to submit this is November 3rd, to be returned by November 10th. You can submit this either in a hard copy or as an email attachment.

RE-EVALUATION POLICY

During the term:

Any requests for remarking of assignments or in-class tests must be received by the course instructors 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

Academic Honesty and Integrity

York students are required to maintain high standards of academic integrity and are subject to the Senate Policy on Academic Honesty (<http://www.yorku.ca/secretariat/legislation/senate/acadhone.htm>). There is also an academic integrity website with complete information about academic honesty. Students are expected to review the materials on the Academic Integrity website (<http://www.yorku.ca/academicintegrity>).

Access/Disability

York provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials.

It is the student's responsibility to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Failure to make these arrangements may jeopardize your opportunity to receive academic accommodations.

Additional information is available at www.yorku.ca/disabilityservices or from disability service providers:

- Office for Persons with Disabilities: N108 Ross, 416-736-5140, www.yorku.ca/opd
- Learning and Psychiatric Disabilities Programs - Counselling & Development Centre: 130 BSB, 416-736-5297, www.yorku.ca/cdc
- Atkinson students - Atkinson Counselling & Supervision Centre: 114 Atkinson, 416-736- 5225, www.yorku.ca/atkcsc
- Glendon students - Glendon Counselling & Career Centre: Glendon Hall 111, 416-487- 6709, www.glendon.yorku.ca/counselling

Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately.

Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete an Examination Accommodation Form, which can be obtained from Student Client Services, Student Services Centre or online at http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf

Student Conduct

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect and to refrain from actions disruptive to such a relationship. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. A statement of the policy and procedures involving disruptive and/or harassing behaviour by students in academic situations is available on the York website

<http://www.yorku.ca/secretariat/legislation/senate/harass.htm>

Please note that this information is subject to periodic update. For the most current information, please go to the CCAS webpage (see Reports, Initiatives, Documents):

http://www.yorku.ca/secretariat/senate_cte_main_pages/ccas.htm.

CLASS SCHEDULE - Fall 2016
KINE 4505 3.0 Neurophysiology of Movement in Health and Disease

| | |
|-------------------|--|
| September 8, 13 | Neuroanatomy and Neurophysiology Review Readings: CH. 1, CH. 2 |
| September 15,20 | Synaptic Communication, Neurotransmitters Readings: CH. 5, CH. 6 |
| September 22, 27 | Somatosensory System Readings: CH. 8 |
| Sept. 29, Oct.4 | Motor System: Brainstem and spinal circuitry Readings: CH. 15, pp. 371-387 |
| October 6 | Motor System: Cortex Readings: CH. 15, pp. 389-392 |
| October 11 | Motor Neuron disorders, Spinal Cord Injury Readings: CH. 16, pp. 393-408 / Lundy-Ekman PP. 284-296 (provided) |
| October 13 | finish lecture material, 1 st half; Q&A |
| October 18 | Midterm – In Class |
| October 20 | Basal Ganglia – Structure, Function, Disorders Readings: CH. 17 |
| October 25 | Cerebellum – Structure, Function, Disorders Readings: CH. 18 |
| November 1 | Parietal dysfunction: Optic Ataxia and neglect syndrome Reading: Parietal syndrome chapter (provided) |
| November 3 | Premotor cortex Readings: CH. 16 pp. 408-416 |
| November 8, 10 | Cortical networks for Movement; (Note: last day to drop course, November 11, 2016) |

*****[NOTE: NO CLASS NOVEMBER 15 & 17 (Society for Neuroscience meeting, everyone away!)]*****

| | |
|-------------|---|
| November 22 | Stroke – acute, Reading: Appendix B: pp. 764-767; Presentation 1 |
| November 24 | Stroke – recovery; Presentation 2 |
| November 29 | Stroke – Rehabilitation & Neuroplasticity; Presentation 3 Readings: CH. 24 |
| December 1 | Finish lecture material; Presentation 4 & 5 |

Term Papers Due (Friday November 25, 5:00 pm to turnitin)