Western University Faculty of Health Sciences
School of Kinesiology

KIN 9466B – Neuroscience of Human Movement
Winter 2021

Instructors
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Office Hours: By appointment  By appointment  By appointment

Calendar Course Description:
A multidisciplinary course designed to provide an advanced understanding of the cortical and spinal mechanisms contributing to human movement and the feedback control mechanisms that support its sustainability. This course will consider movement control in health and disease states and how active lifestyles promote the health of the central nervous system.

Format:
The course meets weekly online (Fridays 9:00 to 12:00) for a 3-hour lecture and/or seminar style class. At each class students are expected to be prepared (i.e., complete assigned readings and pre-lecture assignments) and actively participate in discussion.

Learning Outcomes:

- Understand the motor output from the spinal cord to skeletal muscles and how the anatomical organization (motor units) control voluntary contractions in various tasks and conditions.
- Explain the cortical and spinal contributions to the control of motor units.
- Compare, contrast, and critically evaluate the evidence supporting/refuting the role of sensory feedback in movement and fatigue.
- Explain the role of sensory feedback in cardiovascular and respiratory control in response to exercise.
- Describe the factors that facilitate adjustments in the cardiovascular and respiratory systems to support the exchange of gases with heightened metabolic demands.
- Explain the critical power concept and use it to explain limitations to human performance and the fatigue processes that underpin them
- Demonstrate independent critical thinking and effective and efficient oral and written communication skills.
Schedule:

<table>
<thead>
<tr>
<th>Lecture Date</th>
<th>Lecture Topic</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>January 15th</td>
<td>Fundamental structure and function of motor unites</td>
<td>Rice</td>
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<tr>
<td>January 21st</td>
<td>Motor units in different short and long-term adaptations</td>
<td>Rice</td>
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<tr>
<td>January 28th</td>
<td>Techniques for studying motor unit structure and function</td>
<td>Rice</td>
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<tr>
<td>February 4th</td>
<td>Cortical control of motor units</td>
<td>Christie</td>
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<tr>
<td>February 11th</td>
<td>Reflex control of motor units</td>
<td>Christie</td>
</tr>
<tr>
<td>February 13th – 21st</td>
<td>READING WEEK</td>
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<tr>
<td>February 25th</td>
<td>Sensory feedback in fatigue development</td>
<td>Christie</td>
</tr>
<tr>
<td>March 4th</td>
<td>Critical power: an important fatigue threshold in exercise</td>
<td>Keir</td>
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<tr>
<td>March 11th</td>
<td>Control of the heart and circulation during exercise</td>
<td>Keir</td>
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<tr>
<td>March 18th</td>
<td>Control of respiratory responses to exercise</td>
<td>Keir</td>
</tr>
<tr>
<td>March 25th</td>
<td>Oral Presentations</td>
<td>Christie/Keir</td>
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<tr>
<td>April 2nd</td>
<td>NO CLASS - HOLIDAY</td>
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<tr>
<td>April 8th</td>
<td>Oral Presentations</td>
<td>Christie/Keir</td>
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Evaluation, Format and Style:

1. **Participation (10%)** – Students will actively engage in classroom discussion. The basis for the classroom discussion will surround assigned readings, and general discussion of class material. Students will be required to complete a brief reading assignment for readings posted on OWL. Completion of reading assignments will count toward your participation grade and they will be due at 5 pm on the day before each class (with the exception of Lecture 1 on January 15th).

2. **Scientific Abstract and Summary Assignment (15%)** - A research paper, without an abstract, will be assigned to the class in week 1. From independent reading of the paper, each student will create an appropriate, comprehensive, and comprehensible scientific abstract of no more than 250 words double-spaced (penalty for extra words). On a second separate page each student also will write a lay summary of the paper of no more than 100 words. Students will submit the completed assignment to Dr. Rice. Further details will be explained in class and posted on OWL. **Due date: February 4th**

3. **Peer-review Assignment (25%)** – Students will be given a research manuscript outlining a study investigating a mechanism related to cardiorespiratory control during exercise. Each student will critically evaluate the manuscript as if they were invited by a journal editor for expert peer review. Students will summarize the study, list its strengths and limitations, and provide general and specific comments/suggestions to the authors regarding rationale, study design, analyses and interpretation. Students will also be required to provide a note to the editor with a recommendation for rejection or revision and justification for their decision. **Due date: March 18th**

4. **Research Proposal Assignment (30%)** - Students will write a proposal for a research project aimed at answering a question related to the neuroscience of human movement. Students will select the topic and submit it for approval by Dr. Christie. A 5-page (excluding references), double-spaced paper outlining the proposal will be submitted through OWL. The paper will include background information supporting the proposal, a statement of the aim(s) and hypothesis(es), a description of the methods, and a description of the expected outcomes, and a list of references. A minimum of 5 primary, peer-reviewed research articles must be included. **Due date: April 8th**

5. **Oral Presentation (20%)** - Students will provide a 7-10 minute presentation of their research proposal assignment, using the information outlined in the paper. Each student will complete an individual presentation including background information supporting the proposal, a statement of the aim(s) and hypothesis(es), a description of the methods, and a description of the expected outcomes. Each presentation will be evaluated by 2-5 of your peers and your final mark will be a combination of the peer evaluations and by Dr. Christie and Dr. Keir. Further instructions and grading rubric will be provided on OWL. **Presentations dates: March 25th and April 8th**
Statement of Online Etiquette

Some components of this course will involve online interactions. To ensure the best experience for both you and your classmates, please honour the following rules of etiquette:

- please “arrive” to class on time
- please use your computer and/or laptop if possible (as opposed to a cell phone or tablet)
- ensure that you are in a private location to protect the confidentiality of discussions in the event that a class discussion deals with sensitive or personal material
- to minimize background noise, kindly mute your microphone for the entire class until you are invited to speak, unless directed otherwise
- please be prepared to turn your video camera off at the instructor’s request if the internet connection becomes unstable
- unless invited by your instructor, do not share your screen in the meeting

The course instructor will act as moderator for the class and will deal with any questions from participants. To participate please consider the following:

- if you wish to speak, use the “chat” function and wait for the instructor to acknowledge you before beginning your comment or question
- remember to unmute your microphone and turn on your video camera before speaking
- self-identify when speaking.
- remember to mute your mic and turn off your video camera after speaking (unless directed otherwise)

General considerations of “netiquette”:

- Keep in mind the different cultural and linguistic backgrounds of the students in the course.
- Be courteous toward the instructor, your colleagues, and authors whose work you are discussing.
- Be respectful of the diversity of viewpoints that you will encounter in the class and in your readings. The exchange of diverse ideas and opinions is part of the scholarly environment. “Flaming” is never appropriate.
- Be professional and scholarly in all online postings. Cite the ideas of others appropriately.

Note that disruptive behaviour of any type during online classes, including inappropriate use of the chat function, is unacceptable. Students found guilty of Zoom-bombing a class or of other serious online offenses may be subject to disciplinary measures under the Code of Student Conduct.

Course/University Policies

1. Academic offences:
They are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

A) Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar). All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between Western University and Turnitin.com http://www.turnitin.com
2. Health and Wellness:
Information regarding health and wellness-related services available to students may be found at http://www.health.uwo.ca/.

Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/) for a complete list of options about how to obtain help.

3. Support Services
There are various support services around campus and these include, but are not limited to:
- Student Development Centre -- http://www.sdc.uwo.ca/ssd/
- Student Health & Wellness -- http://www.health.uwo.ca/
- Registrar's Office -- http://www.registrar.uwo.ca/
- Ombudsperson Office -- http://www.uwo.ca/ombuds/

4. Student Code of Conduct
The purpose of the Code of Student Conduct is to define the general standard of conduct expected of students registered at Western University, provide examples of behaviour that constitutes a breach of this standard of conduct, provide examples of sanctions that may be imposed and set out the disciplinary procedures that the University will follow. For more information, visit https://www.uwo.ca/univsec/pdf/board/code.pdf

5. Electronic Device Usage:
During Lectures and Tutorials: Although you are welcome to use a computer during lectures and tutorial periods, you are expected to use the computer for scholastic purposes only, and refrain from engaging in any activities that may distract other students from learning. Please be respectful to your fellow students and turn the sound off. If the professor receives complaints from other students regarding noise or other disruptive behavior (e.g. watching videos on YouTube.com, updating your Facebook status, playing Solitaire), your classroom privileges will be revoked. From time to time, your professor may ask the class to turn off all computers, to facilitate learning or discussion of the material presented in a particular class. Unless explicitly noted otherwise, you may not make audio or video recordings of lectures – nor may you edit, re-use, distribute, or re-broadcast any of the material posted to the course website.