

Western University
Faculty of Health Sciences
School of Kinesiology

KIN 4430F – Neuromuscular Physiology
Fall 2021

<p>Instructor: Dr. Anita Christie Office: Arts & Humanities Bldg Rm 3G16 Email: achris95@uwo.ca Phone: 519/661-2111 x80984 Office Hrs: by appointment</p> <p>Instructor: Dr. Charles Rice Office: Health Sciences Bldg Rm 411D Email: crice@uwo.ca Phone: 519/661-2111 x81628 Office Hrs: by appointment</p> <p>TAs:</p>	<p>Lectures: Tu 1:30pm - 3:30pm Th 1:30pm – 2:30pm</p> <p>Instruction Mode: In-person: SEB 2202</p>
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NOTE: All course information including grades, assignment outlines, deadlines, etc. are available via OWL. Check the website regularly for course announcements.

Calendar Course Description (including prerequisites/anti-requisites):

This course will focus on the structure and function of skeletal muscle with a particular emphasis on muscle plasticity and the adaptive response to exercise.

Prerequisite(s): Kinesiology 2230A/B.

Extra Information: 3 lecture hours. Note: Priority to BSc(Hon) Kinesiology students.

You are responsible for ensuring that you have successfully completed all course pre-requisites, and that you have not taken an anti-requisite course.

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

NOTE: If you wish to enroll in this course without the stated pre-requisite(s), you must obtain written approval from the course instructor. The approval should then be forwarded to your academic counsellor.

My Course Description

The focus is on the structure and function of the neuromuscular system with an emphasis adaptive responses to exercise, aging, and disease.

Learning Outcomes

Upon completion of this course, students will be able to:

1. Identify and understand concepts of basic skeletal muscle and spinal motor neuron architecture and physiology as they relate to voluntary movement in health, exercise training and some clinical situations.
2. Appreciate and critically evaluate the limitations in understanding of the function of various key processes, and their adaptability in response to exercise and disuse.
3. Explore and synthesize this information in a research context.
4. Develop skills in the written expression of ideas through analysis of research papers and exams.
5. Further develop abilities of critical reflection on ideas in scientific understanding relating to the above topics, and integration with other courses of the curriculum.

Course Format:

This course will be provided online, with synchronous learning sessions, meaning lectures will be held in real-time at the scheduled class time. It is strongly to your benefit to virtually attend these live sessions. Please see below for policies about online etiquette for this course.

All of the remote learning sessions for this course will be recorded. The data captured during these recordings may include your image, voice recordings, chat logs and personal identifiers (name displayed on the screen). The recordings will be used for educational purposes related to this course, including evaluations. The recordings may be disclosed to other individuals under special circumstances. Please contact the instructor if you have any concerns related to session recordings.

Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

Required Course Material:

Any required readings will be posted on OWL.

There is no single text required for the course but selected textbooks are listed for background or review material and with sections directly related to the course lecture topics. For review and fundamental understanding of the main concepts discussed in the course refer to one, or more of the following textbooks available in the library or on-line:

- a) McIntosh, B.R., Gardiner, P.F. and McComas, A.J. *Skeletal Muscle: Form and Function*, 2nd ed., Human Kinetics Publishers, Champaign, Ill., c2006. Chaps: 1-4, 9, 10, 12, 13, 15, 16-21, & 22.
- b) Gardiner, P.F. *Neuromuscular Aspects of Physical Activity* 1st or 2nd ed. Human Kinetics Publishers, Champaign, Ill., c2001 or c2010
- c) Kandel E., Schwartz J.H., Jessell T., Siegelbaum S.A., and Hudspeth, A.J. *Principles of Neural Science*, McGraw-Hill Companies, New York, NY, 2013.

PLEASE NOTE:

Lectures introduce a topic and give focus, and required assignments expand on some of the topics to appreciate current research directions. For the course and readings - understand concepts and not technical details

Course Evaluation:

Grade Source	Percentage of Course Grade
Quizzes	5%
Term Assignment Proposal	5%
Term Assignment	25%
Mid-term Exam	30%
Cumulative Final Exam	35%
Total	100%

Quizzes (5%): Quizzes will be completed through Owl, with a time limit. They will be available from Friday-Tuesday on weeks when they are assigned. There will be **no make-up quizzes**.

Term Assignment (30%): - Students will choose a topic related to skeletal muscle function or the neural control of skeletal muscle and write a brief comprehensive review of the topic. A minimum of 5 primary, peer-reviewed journal articles is required. A brief one-page typed (double-spaced) proposal including: the topic, key points to be addressed, and a list of the references to be used, is due **Thursday, October 7th at 11:55 pm – 5%**. The length of the comprehensive review will be 4-6 typed pages (double-spaced), excluding references, due **Thursday, December 2rd at 11:55 pm – 25%**. No extensions without penalty - 10% deduction per day. Further details will be provided on OWL.

Written Exams (65%): 2 exams each 2 hours in duration. Exams will be a combination of multiple choice and short answer questions. The mid-term will be held in class. There will be **no make-up exams**. If the mid-term is missed, with appropriate documentation, the mid-term grade will be re-weighted to the final exam. The final exam will be cumulative and the data and location will be scheduled by the registrar's office).

Assignments are due as stated in the course syllabus and will not be accepted late, except under medical or other compassionate circumstances. Submitting a late assignment without appropriate documentation will result in a zero (0) grade. A missed mid-term examination, without appropriate documentation will result in a zero (0) grade. Acceptable reasons might include hospital stays, serious illness, family emergencies (like serious accidents, illness or death) or similar circumstances.

COURSE OVERVIEW

TOPIC	INSTRUCTOR
Introduction	Rice, Christie
Skeletal muscle – structure & function; and the motoneurone <ul style="list-style-type: none"> • introduction/review of muscle, structure/function, related factors in control of force and phenotypic determinants. • model of striated muscle • overview of motoneurone and action potential generation and propagation • neuromuscular transmission 	Rice
Skeletal muscle and motoneurone disorders <ul style="list-style-type: none"> • ALS • Muscular Dystrophy • Myasthenia gravis 	Christie
Neuromuscular transmission, and the motor unit (MU) <ul style="list-style-type: none"> • coordination of neural and muscular factors in the generation and control of muscle force • special properties and features of motor units – e.g. length/tension, force/velocity, power, potentiation • MU recruitment 	Rice
Motor unit properties and adaptations <ul style="list-style-type: none"> • rate coding of motor units and adaptations 	Rice
Motor unit control <ul style="list-style-type: none"> • Excitatory and inhibitory inputs • Cortical control • Reflex pathways 	Christie
Neuromuscular adaptations <ul style="list-style-type: none"> • Fatigue • Exercise • Inactivity and aging 	Rice, Christie
Central Disorders (time permitting) <ul style="list-style-type: none"> • E.g. Stroke, traumatic brain injury, cerebellar disorders, basal ganglia disorders 	Christie
Review	Rice, Christie

***Note: Course Content:** Our plan is that the topics listed above will be covered, but it is possible that time will not permit all topics to be covered, or that other topics may be added or substituted.

IMPORTANT DATES

Date	Event
Thursday, September 9	First Day of class
Tuesday, September 21	Quiz 1 due by 11:55pm
Tuesday, September 28	Quiz 2 due by 11:55pm
Tuesday, October 5	Quiz 3 due by 11:55pm
Thursday, October 7	Assignment Proposal due by 11:55pm
Tuesday, October 19	Midterm Exam in class
November 1-5	Fall Reading Week No Class
Tuesday, November 16	Quiz 4 due by 11:55pm
Tuesday, November 23	Quiz 5 due by 11:55pm
Thursday, December 2	Assignment due by 11:55pm
Tuesday, December 7	Last day of class

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. Statement on Use of Personal Response Systems (“Clickers”)

If Personal Response Systems (“Clickers”) are used in the course, a reference to the Guidelines for their use (Guidelines are shown below). Instructors are to communicate clearly to students information on how clickers are used including: how the student’s privacy will be protected, how clickers may be used by the instructor for data gathering and for evaluating the students, and why they cannot be used by anyone but the student (since the students involved in misuse of a clicker may be charged with a scholastic offence).

2. **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: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.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>

B) Computer marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

3. Electronic Device Usage:

During Exams - Unless you have medical accommodations that require you to do so, or explicit permission from the instructor of the course, you may not use any of the following electronic devices during ANY of the tests, quizzes, midterms, examinations, or other in-class evaluations: cellphones, smart phones, smart watches, smart glasses, audio players or recorders of any sort, video cameras, video games, DVD players, televisions, laptop/notebook/netbook computers, flashlights or laser pointers.

During Lectures and Tutorials: Although you are welcome to use a computer during lecture 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.**

4. 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.

5. Support Services

There are various support services around campus and these include, but are not limited to:

1. *Student Development Centre* -- <http://www.sdc.uwo.ca/ssd/>
2. *Student Health & Wellness* -- <http://www.health.uwo.ca/>
3. *Registrar's Office* -- <http://www.registrar.uwo.ca/>
4. *Ombudsperson Office* -- <http://www.uwo.ca/ombuds/>

6. Documentation for Academic Accommodation (Illness, Medical/Non-Medical Absences):

http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_12

Students who experience an extenuating circumstance (illness, injury, or other extenuating circumstance) sufficiently significant to temporarily render them unable to meet academic requirements may submit a request for academic consideration through the following routes:

- (i) Submitting a Self-Reported Absence (see below for conditions)
- (ii) For medical absences exceeding 48 hours, submitting a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner to their Academic Counselling in their Faculty of registration in order to be eligible for Academic Consideration; or
- (iii) For non-medical absences exceeding 48 hours, submitting appropriate documentation (e.g., obituary, police report, accident report, court order, etc.) to Academic Counselling in their Faculty of

registration in order to be eligible for academic consideration. Students are encouraged to contact their Academic Counselling unit to clarify what documentation is appropriate. Students seeking academic consideration **must communicate with their instructors no later than 24 hours** after the end of the period covered by either the self-reported absence or SMC, or immediately upon their return following a documented absence.

The following conditions are in place for self-reporting of medical or extenuating circumstances:

- a. a maximum of two self-reported absences between September and April and one self-reported absence between May and August;
 - b. any absences in excess of the number designated in clause a above will require students to present a Student Medical Certificate (SMC) or appropriate documentation supporting extenuating circumstances to the Academic Counselling unit in their Faculty of registration no later than two business days after the date specified for resuming responsibilities.
 - c. The duration of the excused absence will be for a maximum of 48 hours from the time the Self-Reported Absence form is completed through the online portal, or from 8:30 am the following morning if the form is submitted after 4:30 pm;
 - d. The duration of the excused absence will terminate prior to the end of the 48 hour period should the student undertake significant academic responsibilities (write a test, submit a paper) during that time;
 - e. The duration of an excused absence will terminate at 8:30 am on the day following the last day of classes each semester regardless of how many days of absence have elapsed;
 - f. Self-reported absences will not be allowed for scheduled final examinations; for midterm examinations scheduled during the December examination period; or for final lab examinations scheduled during the final week of term;
 - g. Self-reporting may not be used for assessments (e.g. midterm exams, tests, reports, presentations, or essays) worth more than 30% of any given course;
- For medical and non-medical absences that are not eligible for self-reporting Kinesiology students must submit an Academic Consideration Request form found online https://www.uwo.ca/fhs/kin/undergrad/files/accommodation_request.pdf in addition to an SMC or appropriate documentation in the event of a non-medical absence. These documents will be retained in the student's file, and will be held in confidence in accordance with the University's Official Student Record Information Privacy Policy.

7. **Grades:** Where possible assignment objectives and rubrics will be posted on OWL. Should you have a concern regarding the grade you received for an assignment or feel that it is unfair in any way, you must wait 24 hours from the receipt of the assignment to approach the instructor or TA. In doing so, please make an appointment and prepare in writing, with evidence, why you feel your grade is inappropriate. Please be aware that in requesting a grade reassessment, your grade could go up/down/or stay the same. Note that calculations errors (which do occur!) should be brought to my attention immediately.

Generally, students can expect some form of feedback on their performance in a course before the drop date.

- November 12th, 2020 (for first term half-courses)
- November 30th, 2020 (for full-year courses)
- March 7th, 2021 (for second term half-or full year courses)

A+	90-100	<i>One could scarcely expect better from a student at this level</i>
A	80-89	<i>Superior work that is clearly above average</i>
B	70-79	<i>Good work, meeting all requirements and eminently</i>
C	60-69	<i>Competent work, meeting requirements</i>
D	50-59	<i>Fair work, minimally acceptable.</i>
F	below 50	<i>Fail</i>

Rounding of Grades (for example, bumping a 79 to 80%):

This is a practice some students request. **This practice will not occur here.** The edges of this course are clear and sharp. The mark attained is the mark you achieved and the mark assigned; there is no rounding to the next grade level, or 'giving away' of marks. Please don't ask me to do this for you; the response will be "please review the course outline where this is presented".

8. **Classroom Behaviour:** Class will begin promptly at the time specified at the top of page one of this syllabus. In the event that you must arrive late, please enter the classroom with a minimal disturbance to the class. Please keep all electronic devices on silent and avoid distracting classmates.

9. **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>