Course Outline

Human Neuromuscular Physiology

HK*3100 Winter 2015

Instructor:

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Teaching Assistants:

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Office Hours:

By Appointment Only (For both the Professor and Teaching Assistants)

Lecture Hours:

Monday, Wednesday, Friday 11:30-12:20 MACN room 105

Course Text:

HK*3100 Course Package. Available in the Guelph Book Store ($85)
This package is a collection of selected chapters from Kandel: Principles of Neural Science [4th edition] and Enoka: Neuromechanics of Human Movement [3rd edition]. The readings complement the material presented in class, and should be the first place to go for clarification of course concepts. Please note that some lecture material will not be covered in the readings and the readings may go into the details not covered in lecture.
Additional mandatory readings will be posted on CourseLink throughout the semester.

Course Description

This course presents key concepts about the control and coordination of human movement through an examination of neurophysiological and functional neuroanatomical processes.

Learning Objectives

Neuromuscular physiology is a broad scientific discipline, which includes many topics and sub-topics. It is impossible to cover them all in detail in a brief, twelve-week course. The goal of this course is to introduce foundational concepts in this field while providing an opportunity for deeper exploration/discussion on specific topics of interest. Upon completion of this course you will:

- Develop an appreciation of the current scientific understanding in the field of neuromuscular physiology and some of the questions which remain unanswered
- Be able to integrate knowledge from different research areas to evaluate neuromuscular concepts
- Have increased **scientific literacy**; strengthened though critical evaluation of the strengths and weaknesses of primary research in the field of neuromuscular physiology
- Become a more proficient **scientific writer** (with a focus on using clear, concise, scientific language)

Course Approach

This course employs a learner-centered approach to facilitate a deep understanding of the many aspects of human neuromuscular physiology. Independent learning along with group discussions are important features of this course. Course material is presented in lecture and complemented with assigned journal articles and supplementary course package readings. To encourage lecture attendance and peer-collaboration, **incomplete lecture slides** will be provided on CourseLink prior to each lecture (complete slides will NOT be provided). The discussion board will be a key source of peer, TA and instructor support. Independent learning will be assessed through a literature critique assignment, which provides an opportunity for you to critically assess primary literature in the neuromuscular field. The midterm and final exam will test your understanding of the lecture material and assigned readings through both topic specific and integrative questions.

Course Evaluation

Assessment	Weighting	Due Date
Journal Article Quizzes	5%	2 x 2.5% - to be completed on CourseLink by **January 20** and **February 26** at 11:59PM
Journal Article Critique	25%	Electronic copy online and a hard copy in class **February 9** OR **March 16**
Midterm Exam	30%	**February 11** ROZH 101 5:30-6:50pm
Final Exam	40%	**April 16** 7:00-9:00 pm Room TBD

NOTE: The deadline for the journal article critique is the absolute **latest** the item will be accepted without penalty. If handed in late a 10% penalty applies per day.
I encourage you to try and submit early.

Course Topics

A. MUSCLE AND MOTOR UNITS
- Structure, function, recruitment, fatigue

B. SOMATOSENSORY RECEPTORS
- Muscle spindle, golgi tendon organ, skin (cutaneous) receptors, joint receptors
- Kinesthesis, proprioception

C. SPINAL CORD NEUROPHYSIOLOGY
- Spinal reflex loops
- Stretch reflexes, long loop reflexes, influences within the spinal cord
- Central pattern generators

D. POSTURE, BALANCE AND LOCOMOTION
- The vestibular system
- Motor & postural control strategies
- Where does sensory input fit in?

E. HIGHER LEVEL CONTROL
- Motor cortex and sensory cortex
- The cerebellum
- The basal ganglia
- Cortical pathways

Journal Article Critique

This assignment provides you an opportunity to 1) read and evaluate primary literature in the neuroscience field as well as 2) gain experience in scientific writing. You will select from four journal articles provided during the first week of class. Two are designated for the first half of the course, as their topics will be discussed in lecture before the midterm, while the other two are designated for the latter half. There will be an equal number of students critiquing each article so you may not get your first choice. They are distributed as a first come-first serve basis. To choose an article you must sign onto CourseLink and select the article that you prefer. Once the max number of students has chosen a specific article, it will no longer be available for selection. The critique will be a maximum of five double spaced pages and must include a minimum of five additional primary references. You are given at least 5 weeks to complete the assignment. **DO NOT LEAVE THIS ASSIGNMENT TO THE WEEK BEFORE IT IS DUE!!** It requires thorough planning and extensive research of the scientific field.

This assignment is designed to be flexible, providing room for you, the author to structure the critique as you see fit. However; within this flexibility there are formatting guidelines, which need to be followed. Within these guidelines you are encouraged to be creative exploring the literature and have fun working on this assignment.

There is a detailed description of the Journal Article Critique assignment including guidelines and a marking rubric provided on CourseLink.

Journal Article Quizzes

These quizzes are designed to evaluate your comprehension of the assigned journal article. The quizzes will consist of 5 multiple-choice questions randomly chosen from a list of 10 to 15. The quizzes will be up on CourseLink for a week and once you have begun, it will only remain open for 60 minutes to

complete. It is expected that you read the article before attempting the quiz and answers to the questions will be taken up in class on January 20th and February 28th.

CourseLink Discussion Board

Topic Summary: At the end of each lecture topic (highlighted below) you will be encouraged in lecture to independently reflect upon: i) key concepts you learned ii) concepts that need more clarification and iii) areas that you want to learn more about and to post them on the discussion board. TAs and the instructor will monitor and respond to these points clarifying areas of confusion. Common areas will form the basis of future review lectures.
Exam Question Brainstorm: A great way to learn is to think like a teacher! A discussion thread will be created for you to come up with, and provide answers to your own exam questions. You will have access to other students' questions/answers and are encouraged to provide your own thoughts. 5-10% of the midterm and exam marks will be taken from questions presented on the discussion board (pending adequate participation).

Course Policies

- When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing/e-mail, with your name, student ID# and e-mail contact. Where possible, this should be done in advance of the missed work or event. See the undergraduate calendar for information on regulations and procedures for academic consideration: Undergraduate Calendar - Academic Consideration
- The penalty for late submission of the Journal Article Critique is a reduction of 10% per day. The critique must be submitted on CourseLink by the start of class and a hard copy must also be handed in at the beginning of class on the date it is due. There will be no extension for the journal article quizzes as the answers to the questions will be discussed in lecture the following day.
- Laptops: they are permitted but not recommended in lecture. Incomplete class slides will be provided on CourseLink prior to class and note taking will include both writing concepts as well as drawing diagrams and adding to figures. Many students find sitting behind laptops distracting so please be conscious of this if you choose to bring a laptop to lecture.
- Communication: As per University regulations, all students are required to *routinely check their uoguelph.ca email.* This is the official route of communication between the University and its students. In addition, students are required to *check CourseLink* for further course specific communications.
- Emailing: To encourage independent learning, emailing the lecturer or teaching assistants about concepts should be the last resort after reading lecture slides, primary literature and using the discussion board. If you do send an email, please DO NOT email the lecturer or teaching assistants the same questions individually, and allow at least 24 hours for a response.
- Accessibility: This course (and the University of Guelph) is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. Students requiring service or accommodation, whether due to an

identified, ongoing disability or a short-term disability should contact the Center for Students with Disabilities (CSD) as soon as possible.

CSD: 519-824-4120 ext. 56208
csd@uoguelph.ca
Centre for Students with Disabilities

- Recording of Materials: Lectures cannot be recorded or copied without the **permission of the instructor.** Material recorded with permission is restricted to use for that course unless further permission is granted.

University Policies on Academic Misconduct

- Academic misconduct, such as plagiarism, is a serious offence at the University of Guelph and offences will be dealt with severely. To avoid unintentional plagiarism please consult the University's policies on plagiarism and a description of plagiarism by following the links below. Undergraduate Calendar - Academic Misconduct and Academic Integrity - Plagiarism

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Conduct in a Large Class

This is a large class but you are not a small part of it! It takes commitment from everyone to make our time together as valuable as possible. In order for you to get the most of the class please consider the following:

- All testable exam material comes from lectures. Complete lecture slides will not be provided.
- It is expected that you come to lecture prepared to learn and participate. This involves arriving on time and staying to the end, bringing the incomplete class notes and having reviewed the readings each week. Frequent opportunities for small group discussions will be provided during lecture. Coming to class prepared will allow you and your classmates to get the most out of these exercises.
- The due dates for the journal article critique are fixed. It is critical that these deadlines are met as extensions will only be granted in the most extreme situations. If a deadline cannot be met, you must inform the instructor in person or by email *as soon as possible.*
- It is expected that you help maintain a safe and positive environment for yourself and your classmates to learn. In lecture this means limiting distractions to the students around you (cell phones, laptops, talking, packing up early etc) as well as treating your fellow classmates, the teaching assistants and instructor with respect at all times.
- If you have a problem with the course material or in the way it is being presented, it is expected that you respectfully bring up your concerns with the course instructor as soon as possible.
- Providing a challenging and supportive learning environment is a priority of this course and involves a team effort from all of us.
