

**MCMASTER UNIVERSITY**  
**KIN 3E03/LIFESCI 3K03**  
**NEURAL CONTROL OF MOVEMENT**  
**WINTER 2018**

**Course meeting times:** Mondays 7:00-10:00, LRW B1007

**Instructor:** Danny M. Pincivero, Ph.D.

**Office:** TBA

**Phone:** TBA

**E-mail:** d2pinciv@uwaterloo.ca (when sending me an email you must type the **course number** in the Subject heading, otherwise it may be deleted due to the large number of junk emails that I receive.)

**Office Hours:** TBA

**TEACHING ASSISTANTS:** Jenin El Sayes (elsayej@mcmaster.ca), Stevie Foglia (foglias@mcmaster.ca), Mitchell Locke (lockem@mcmaster.ca)

**UNDERGRADUATE COURSE CALENDAR DESCRIPTION** Neuromuscular control underlying human movement. Topics include basic neurophysiology, mechanisms of sensation, reflexes, voluntary movement and theories of motor control with special reference to brain function.

**COURSE CONTENT OBJECTIVES:** On completion of this course, the student should be able to comprehend/identify/discuss the following items:

- the basic components of the human nervous system
- the key processes involved in the passage of information between neurons
- how the nervous system controls muscles and monitors body and limb positions
- how the brain utilizes visual information to control skilled movement
- how various structures of the brain control human movement
- cognitive/computational perspectives in motor control of movement various movement pathologies
- current strategies and therapies used to restore function after disease and injury

**LEARNING OBJECTIVES:** On completion of this course, the student should be able to demonstrate competencies in:

- A) **Personal organization and time management** by attending, and preparing for, lectures by completing assigned readings and reviewing previous lecture content.
- B) **Research management** in identifying and using resources (valid online resources, Medline) effectively to complete course assignments.
- C) **Reading and writing** skills synthesizing information relayed via course materials and completing written assignment and examinations.
- D) **Computer applications** in effectively completing course assignments by utilizing applications packages (i.e., Microsoft Word, Powerpoint, Excel) and valid online resources.
- E) **Communicating through evolving media** via the internet (i.e., email) and Avenue to Learn with the course instructor and teaching assistants.

**TEXTBOOK:** Bear MF, Connors BW, Paradiso MA. Neuroscience: Exploring the Brain. 4th Edition. Wolters Kluwer. ISBN: 978-1-4511-0954-2.

## COURSE STRUCTURE

This course will make use of the course website for providing instructional materials that support the lectures. The course website is accessed through the McMaster University distance learning website (<http://avenue.mcmaster.ca>). The prescribed lectures will be delivered through the use of Powerpoint, in addition to traditional means (i.e., use of the chalkboard, overhead projectors, etc.). The students should download and/or print of a copy of the provided notes corresponding to the lecture AND bring extra blank paper to class.

## EVALUATION:

- |                     |     |  |
|---------------------|-----|--|
| <b>MIDTERM EXAM</b> | 30% | <b>Monday February 12</b> (regular class time) |
|---------------------|-----|--|
- The exam will consist of multiple choice and short answer-type questions and will encompass all pertinent lecture material ending Monday February 5th. In the event that a student submits the MSAF, the retake will take place **Friday Feb 26** in a location to be announced. The retake examination will consist of short answer and essay questions ONLY.
- |                   |     |  |
|-------------------|-----|--|
| <b>FINAL EXAM</b> | 35% | <b>Final exam period</b> (day/time/location TBA) |
|-------------------|-----|--|
- The final exam will NOT be cumulative (i.e., it will only cover lecture-based material not directly addressed on the midterm examination).
- |                 |     |   |
|-----------------|-----|---|
| <b>QUIZZAMS</b> | 25% | <b>See Lecture Schedule</b> (1st 20 minutes of class) |
|-----------------|-----|---|
- The "quizzam" is a hybrid of an assessment tool that evaluates student knowledge in the subject matter that is more extensive than what would be addressed on a standard "quiz" but considerably less than a traditional "exam". Each quizzam will take place at the start of the scheduled class period. There will be no scheduled re-takes for missed quizzams. For this reason, the lowest quizzam grade will be dropped.
- |                       |     |  |
|-----------------------|-----|--|
| <b>ONLINE QUIZZES</b> | 10% |  |
|-----------------------|-----|--|
- The online quizzes will be made available on AVENUE and will be opened on the **Tuesday** of the scheduled week, and will remain open through **Friday** evening. The quiz will evaluate knowledge covered in the lectures that occur in the same week of the quiz. The final grade for the online quizzes will be assessed by dividing the number of correct responses on ALL quizzes by the total number of questions throughout the semester. The dates for the availability of the online quizzes are as follows: **January 16, January 30, February 27, March 13, March 27.**

## COURSE REQUIREMENTS AND POLICIES

- Class attendance:** Attendance at the scheduled lectures will NOT be recorded. However, it is **STRONGLY RECOMMENDED** that students attend **all** lectures in order to gain their best possible understanding of the material. The examinations for this course will be based mainly from the lecture material; however, the amount of material from the readings that will appear on the exams will vary by section. Although the assigned readings will serve as valuable resources for the class, contemporary material from the scientific literature will be presented in lecture. It is the students' responsibility to obtain notes from another student if a class is missed. In the event that a student misses a class, the instructors' notes will **NOT** be made available, nor will the instructor re-present the material.
- Cellular phones:** The student will be required to turn off their phones, or put it on its' "silent" mode prior to the start of each lecture. Cellular phones will **NOT** be permitted during examinations.

## POLICY REGARDING DEFERRED TESTS AND EXAMS

Students who miss the term test or final exam for legitimate reasons such as illness may be allowed to write a deferred or "make-up" test. When using the MSAF, report your absence to [d2pinciv@uwaterloo.ca](mailto:d2pinciv@uwaterloo.ca) immediately (normally within 2 working days) by email to learn what relief may be granted for the work you have missed, and relevant details such as revised deadlines, or time and location of a make-up exam. In all instances, appropriate documentation must be submitted to the Office of the Associate Dean, Faculty of Science.

Students who miss a Registrar-scheduled final exam can apply to the Associate Dean's office for permission to write in the deferred final exam schedule. In all cases, appropriate documentation must be submitted to the Office of the Associate Dean, Faculty of Science, for consideration of deferred examination permission. Under no circumstances will the instructor re-schedule a final exam for individual students.

### **ACADEMIC INTEGRITY**

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences (e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript reading "Grade of F assigned for academic dishonesty", and/or suspension or expulsion from the university). It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at: <http://www.mcmaster.ca/univsec/policy/AcademicIntegrity.pdf>

The following illustrates only three forms of academic dishonesty:

- Plagiarism (e.g. the submission of work that is not one's own or for which other credit has been obtained),
- Improper collaboration in group work.
- Copying or using unauthorized aids in tests and examinations.

### **ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES**

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone (905) 525-9140 ext. 28652 or email [sas@mcmaster.ca](mailto:sas@mcmaster.ca). For further information, consult McMaster University's Policy of Academic Accommodation of Students with Disabilities. <http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf>

### **MODIFICATIONS TO COURSE**

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

### **MISSED STUDENT ABSENT FORM**

If you are absent from the university for a minor medical reason, lasting fewer than 3 days, you may report your absence, without documentation, using the McMaster Student Absence Form. Absences for a longer duration or for other reasons (eg. religious, personal) must be reported to your Faculty/Program office, with documentation, and relief from term work may not necessarily be granted. When using the MSAF, report your absence to **d2pinciv@uwaterloo.ca**. Then contact the instructor/lab TA immediately (normally within 2 working days) by email/telephone/in person to learn what relief may be granted for the work you have missed, and relevant details such as revised deadlines, or time and location of a make-up exam.

**ON-LINE LEARNING RESOURCES**

Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

**LECTURE SCHEDULE**

<b>DATE</b>	<b>TOPIC</b>	<b>READINGS</b>
<b>WEEK 1</b> Mon Jan 8	Introduction <ul style="list-style-type: none"> <li>Nervous system structure and function (general), the neuron, protein synthesis.</li> </ul>	Chapters 1 & 2
<b>WEEK 2</b> Mon Jan 15	The Electrical Human <ul style="list-style-type: none"> <li>Neuron membrane structure, action potentials and synaptic transmission</li> </ul>	Chapters 3-5
<b>WEEK 3</b> Mon Jan 22	<b>QUIZZAM #1 (weeks 1-2)</b> Nervous system structure and function (detailed)	Chapter 7
<b>WEEK 4</b> Mon Jan 29	Auditory and vestibular systems	Chapter 11
<b>WEEK 5</b> Mon Feb 5	<b>QUIZZAM #2 (weeks 3-4)</b> Visual system	Chapters 9-10
<b>WEEK 6</b> <b>Mon Feb 12</b>	<b>MIDTERM EXAMINATION</b>	
<b>WEEK 7</b> <b>Mon Feb 19</b>	<b>MID-TERM RECESS, NO CLASS</b>	
<b>WEEK 8</b> Mon Feb 26	Skeletal muscle structure and function, somatic sensory system	Chapters 12 & 13
<b>WEEK 9</b> Mon Mar 5	<b>QUIZZAM #3 (weeks 5, 8)</b> Somatic sensory system	Chapters 12 & 13
<b>WEEK 10</b> Mon Mar 12	Spinal control of movement and integration	Chapter 13
<b>WEEK 11</b> Mon Mar 19	<b>QUIZZAM #4 (weeks 9-10)</b> Brain control of movement and integration	Chapter 14
<b>WEEK 12</b> Mon Mar 26	Basal ganglia and cerebellar control of movement	Chapter 14
<b>WEEK 13</b> Mon Apr 2	<b>QUIZZAM #5 (weeks 11-12)</b> Special topics: Psychophysics, mental fatigue, concussion (mild traumatic brain injury)	
<b>WEEK 14</b> Mon Apr 9	Special topics: Psychophysics, mental fatigue, concussion (mild traumatic brain injury)	

**NOTE:** The duration of time spent on each unit may vary from the original posted schedule.