

**KIN 765**  
**Neurophysiology of Movement**  
**Fall, 2016**

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**Office Hours:** Tuesday, Thursday: 11:15 – 12:45  
(Additional times by appointment)

**Course Description**

The course provides an introduction to neurophysiology with emphasis on the voluntary control of human movement. This course is designed to provide graduate students with the background knowledge necessary to interpret and conduct research in neurophysiology and related disciplines (motor control).

**Course Structure**

The regularly scheduled classes will be lecture/discussion/lab in nature. Labs will serve to introduce students to research techniques in neurophysiology.

**Course Objectives**

1. To provide an overview of the organization of the central nervous system as well as the planning and execution of voluntary movement.
2. To provide the student with a working knowledge of contemporary research techniques in neurophysiology.
3. To provide the student with the tools necessary to interpret and conduct research in neurophysiology and related disciplines such as motor control/motor learning.

**Suggested Text**

Eric R. Kandel, MD; James H. Schwartz, MD, PhD; Thomas M. Jessell, PhD; Steven A. Siegelbaum, PhD; and A. J. Hudspeth, PhD (2012). *Principles of Neural Science, Fifth Edition*. McGraw-Hill.

**Course Requirements**

Throughout this course, students will be responsible for:

1. Lectures and class discussions.
2. Handouts.
3. Exams.
4. Project/Presentation

**Student Evaluation**

Final grades will be determined according to the following criteria:

<b>Test 1</b> .....	<b>20%</b>
<b>Test 2</b> .....	<b>20%</b>
<b>Test 3</b> .....	<b>20%</b>
<b>Test 4</b> .....	<b>20%</b>
<b>Class Project/Presentation</b> .....	<b>20%</b>

**Grading Scale:**

92% - 100%	= A
90% - 91%	= A-
88% - 89%	= B+
82% - 87%	= B
80% - 81%	= B-
78% - 79%	= C+

72% - 77% = C  
70% - 71% = C-  
68% - 69% = D+  
62% - 67% = D  
60% - 61% = D-  
Below 60% = F

### **Additional Resources**

Enoka, R.M. (2008). *Neuromechanics of Human Movement*. (4<sup>th</sup> Edition). Champaign, Illinois: Human Kinetics.

Latash, M.L. (2007). *Neurophysiological Basis of Movement* (2<sup>nd</sup> Edition). Champaign, Illinois: Human Kinetics.

Pierrot-Deseilligny, E. and Burke, D. (2012). *The Circuitry of the Human Spinal Cord*. Cambridge University Press.

**Academic Misconduct** – Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the *Student Academic Misconduct Policy* (approved December 9, 2005) located at: <http://studentconduct.unlv.edu/misconduct/policy.html>.

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**Disability Resource Center (DRC)** – The Disability Resource Center (DRC) determines accommodations that are “reasonable” in promoting the equal access of a student reporting a disability to the general UNLV learning experience. In so doing, the DRC also balances instructor and departmental interests in maintaining curricular standards so as to best achieve a fair evaluation standard amongst students being assisted. In order for the DRC to be effective, it must be considered in the dialog between the faculty and the student who is requesting accommodations. For this reason faculty should only provide students course adjustment after having received an “Academic Accommodation Plan.” If faculty members have any questions regarding the DRC, they should call a DRC counselor. UNLV complies with the provisions set forth in Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990. The DRC is located in the Student Services Complex (SSC-A), Room 143, phone (702) 895-0866, fax (702) 895-0651. For additional information, please visit: <http://drc.unlv.edu/>.

**Religious Holidays Policy** – Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor no later than the end of the first two weeks of classes, **February 1, 2013**, of his or her intention to participate in religious holidays that do not fall on state holidays or periods of class recess. This policy shall not apply in the event that administering the test or examination at an alternate time would impose an undue hardship on the instructor or the university that could not reasonably be avoided. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=4&navoid=164>.

**Transparency in Learning and Teaching**—The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information:

<https://www.unlv.edu/provost/teachingandlearning>

<https://www.unlv.edu/provost/transparency>

**Incomplete Grades** - The grade of “I” – Incomplete – can be granted when a student has satisfactorily completed all course work up to the withdrawal date of that semester/session but for reason(s) beyond the student’s control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. A student who receives an “I” is responsible for making up whatever work was lacking at the end of the semester. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the “I” grade.

## Library Resources

Students may consult with a librarian on research needs. For this class, the subject librarian is [https://www.library.unlv.edu/contact/librarians\\_by\\_subject](https://www.library.unlv.edu/contact/librarians_by_subject). UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at <https://www.library.unlv.edu/>.

**Tutoring and Coaching**—The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit <http://www.unlv.edu/asc> or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

**UNLV Writing Center** – One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 895-3908. The student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>

**Rebelmail** – By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu.

**Final Examinations**—The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: <http://www.unlv.edu/registrar/calendars.university>. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu.

## Semester Schedule:

The **tentative** semester schedule is shown below. The class lectures are divided into four sections with a test each sections.

### CLASS SCHEDULE (SUBJECT TO CHANGE)

CLASS #	DATE	CLASS DESCRIPTION
1	Tuesday, August 30	Syllabus, Introductions, etc.
2	Thursday, September 1	CNS Organization; Nerve Cells, Resting Membrane Potential, Action Potentials, and Synaptic Transmission
3	Tuesday, September 6	Motor Units, Muscle Action, and EMG (Part 1)
4	Thursday, September 8	Motor Units, Muscle Action, and EMG (Part 2)
5	Tuesday, September 13	TEST REVIEW
6	Thursday, September 15	TEST 1
7	Tuesday, September 20	Spinal Reflexes and the Somatosensory System
Thursday, September 22		NO CLASS
8	Tuesday, September 27	Techniques in Neurophysiology 1 – Spinal Reflexes
9	Thursday, September 29	Movement Planning
10	Tuesday, October 4	Voluntary Movement 1: The Primary Motor Cortex
11	Thursday, October 6	Transcranial Magnetic Stimulation and Transcranial Direct Current Stimulation
12	Tuesday, October 11	TEST REVIEW
13	Thursday, October 13	TEST 2
14	Tuesday, October 18	Techniques in Neurophysiology 2 – TMS and tDCS
15	Thursday, October 20	Voluntary Movement 2: Premotor and Parietal Cortex
16	Tuesday, October 25	STUDENT PRESENTATIONS 1-3
17	Thursday, October 27	Voluntary Movement 3: Basal Ganglia

18	Tuesday, November 1	STUDENT PRESENTATIONS 4-6
19	Thursday, November 3	Voluntary Movement 4: Cerebellum
20	Tuesday, November 8	STUDENT PRESENTATIONS 7-9
21	Thursday, November 10	TEST REVIEW
22	Tuesday, November 15	TEST 3
23	Thursday, November 17	Neural Mechanisms of Muscle Fatigue
24	Tuesday, November 22	Measuring Movement Accuracy and Movement Variability: Motor Control Theories
	Thursday, November 24	NO CLASS THANKSGIVING HOLIDAY
25	Tuesday, November 29	Neurophysiology of Electrical Muscle Stimulation (Lecture and Lab)
26	Thursday, December 1	TEST REVIEW
	Tuesday, December 6	NO CLASS STUDY WEEK
	Thursday, December 8	NO CLASS STUDY WEEK
27	Tuesday, December 13	TEST 4-FINAL 1-3 PM