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KIN 330.01: Motor Control and Learning

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Motor Control and Learning
HHP 384/KIN330
Fall 2013

Instructor:

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Teaching Assistant:

Allie Perline

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Office Hours: by appointment
E-mail: allison.perline@umconnect.umt.edu

General Course Information :

Credit	3.0 semester credits
Days, Times, Place	Tuesday & Thursday, 2:10-3:30pm, Social Sciences room 344

Required Material:

Suggested Text:

Neuromuscular Aspects of Sports Performance, 2011, Paavo V. Komi, Published International Olympic Medical Commission & Wiley-Blackwell

The Neuroscience of Human Movement, 1998, Charles T. Leonard, Published Mosby-Year Book.

Neurophysiological Basis of Movement 2nd Edition, 2008. Mark L. Latash. Published by Human Kinetics.

Human Anatomy & Physiology 9th Edition, 2012, Marieb & Hoehn, Published by Benjamin Cummings

Course Content:

This course will focus on developing an understanding of the anatomy and physiology within the nervous system necessary for movement. We will establish an understanding of the basic science involved in the control of motor tasks, and use this foundation to evaluate case studies that will focus on sport performance, clinical deficits, age-related alterations, learning of motor tasks following injury, and other motor-related tasks.

Learning Objectives:

After the completion of this course, the successful student should be able to:

- 1) Recognize and describe, the contributions provided by the different levels of biological organization (e.g.: cellular, tissue, organismal) to human movement.

- 2) Recognize and describe, the anatomical structures responsible for the control of human movement
- 3) Apply an understanding of basic physiological processes to specific motor-related case-studies.
- 4) Develop the ability to generate experimental hypothesis tests that address basic questions from the field of motor control and learning.

Grading Scale:

The final grade will be determined on the cumulative points attained and will be on the traditional scale:

Letter Grade Percentage	Percentage Range
A	100– 93.5
A-	93.4 – 90
B+	89.9 – 87
B	86.9 – 83
B-	82.9 – 80
C+	79.9 – 77
C	76.9 – 73
C-	72.9 – 70
D+	69.9 – 67
D	66.9 – 63
D-	62.9 – 60
F	Below 60

The grade will be apportioned as follows:

ITEM	WEIGHT (out of 550)
Midterm #1	100
Midterm #2	100
Final Examination	200
Group Learning Assignment, Lecture Participation, Problem Sets, Quizzes	150
TOTAL	550

Course Components:

1. Acceptable Behavior

- a. You must come prepared to lecture.
- b. In addition to being prepared to discuss relevant materials in class, you must **arrive on time** and act in a manner which is courteous and does not impede the learning of other students in the class.

- c. Cell phones, PDAs, and other electronic devices are to remain **silenced and stowed** for the entire duration of the class.
- d. You are to remain attentive and respectful of the Professor, Teaching Assistants, guest lecturers, or whomever will be leading a session. During course meeting times, **texting, sleeping, reading the newspaper, studying materials non-related to Motor Control and Learning, etc.** are examples of being disrespectful.

2. Lectures:

It is your responsibility to attend each lecture session for this course and to obtain and understand the material presented. In the event of an absence due to a University sponsored activity or an officially authorized absence, the student remains responsible for the material. The lectures will closely follow the assigned readings, however they will also introduce information that may not be covered within your text, accordingly your attendance is strongly encouraged.

3. Readings:

The assigned readings have been identified to provide students with a different perspective and to address additional material. Certain topics covered during the semester are not addressed in your text, as we approach these units you may be provided with further outside readings. The readings will provide students with a foundation for the material covered in lecture, and will serve as a useful study resource. Accordingly, the readings should be done in advance of the specified lectures. You are responsible for knowing the material in the assigned readings. We will encourage your adherence to this important course component through **Weekly Reading Quizzes**.

4. Assignments:

Problem sets, reports and other work assigned during the semester will provide an opportunity for students to develop your quantitative and reasoning skills. The assignments you receive on an ongoing basis will be of a similar style to the tasks you will face during the course examinations. You are encouraged to work in study groups to complete the assignments. However, to encourage equal participation within these groups you must list all of your collaborators on each assignment. Due dates will be announced when the work is described and assigned, late submissions will be penalized in proportion to their tardiness.

5. Examinations:

There will be two midterm exams. These will be held during the regular lecture period and will cover only the material presented since the previous exam. The final examination will be cumulative and will draw from the materials presented throughout the semester in lecture. The exams will be a combination of multiple choice, matching, short and long written answers. Your study guide will be the notes you take in class, so work and listen diligently.

6. Academic Misconduct:

Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. Academic misconduct is defined as all forms of academic dishonesty and the Student Conduct Code. In particular, Student Conduct Code Section IV.a.5 identifies the following violations: *Submitting false information: Knowingly*

submitting false, altered, or invented information, data, quotations, citations, or documentation in connection with an academic exercise

The following list provides additional examples of academic dishonesty:

- a. **Plagiarism:** Representing another person's words, ideas, data, or materials as one's own.
- b. **Misconduct during an examination or academic exercise:** Copying from another student's paper, consulting unauthorized material, giving information to another student or collaborating with one or more students without authorization, or otherwise failing to abide by the University or instructor's rules governing the examination or academic exercise without the instructor's permission.
- c. **Unauthorized possession of examination or other course materials:** Acquiring or possessing an examination or other course materials without authorization by the instructor.
- d. **Tampering with course materials:** Destroying, hiding, or otherwise tampering with source materials, library materials, laboratory materials, computer system equipment or programs, or other course materials.
- e. **Submitting false information:** Knowingly submitting false, altered, or invented information, data, quotations, citations, or documentation in connection with an academic exercise.
- f. **Submitting work previously presented in another course:** Knowingly making such submission in violation of stated course requirements.
- g. **Improperly influencing conduct:** Acting calculatedly to influence an instructor to assign a grade other than that actually earned.
- h. **Substituting, or arranging substitution, for another student during an examination or other academic exercise:** Knowingly allowing others to offer one's work as their own.
- i. **Facilitating academic dishonesty:** Knowingly helping or attempting to help another commit an act of academic dishonesty, including assistance in an arrangement whereby any work, classroom performance, examination activity, or other academic exercise is submitted or performed by a person other than the student under whose name the work is submitted or performed.
- j. **Altering transcripts, grades, examinations, or other academically related documents:** Falsifying, tampering with, or misrepresenting a transcript, other academic records, or any material relevant to academic performance, enrollment, or admission.

7. Students with Disabilities:

If you are a student with a disability and wish to discuss reasonable accommodations for this course, contact me privately to discuss the specific modifications you wish to request. Please be advised I may request that you provide a letter from Disability Services for Students verifying your right to reasonable modifications. If you have not yet contacted Disability Services, located in Lommasson Center 154, please do so in order to verify your disability and to coordinate your reasonable modifications. For more information, visit the Disability Services website at: <http://life.umt.edu/dss>.

8. Instructor Availability and Office Hours:

I strongly encourage students to attend my office hours, or to make an appointment, in order to discuss course related concerns. However, students should be aware that I may not be available outside of these opportunities. In such a case, please see your TA for this course, Allie Perline, during her office hours or by appointment with her.

Tentative Course Outline and Dates of Importance

WEEK	DATES	TOPICS	READINGS
1	8/27 & 8/29	Introduction, Cells, Action Potentials	Leonard Chap 1; pp 1-13 Marieb, Chap 11 ; pp 385-425
2	9/3 & 9/5	Info Transmission to Muscle	Marieb, Chap 11 ; pp 385-425 Marieb, Chap 9; pp 275-305
3	9/10 & 9/12	Receptors, Motor Units, EMG, Lab #1	McMahon, Chap 6; pp 139-166
4	9/17 & 9/19	Neuro-Anatomy <i>Visiting Speaker Rehab & Motor Control</i> <i>Joel Shehan - Professional Therapy Associates</i> <i>Whitefish, MT</i>	Leonard, Chap 2 ; pp 15-69 Marieb, Chap 9; pp 429-479 TBA
5	9/24 & 9/26	Spinal Excitation & Inhibition- Midterm #1	Latash, Chap 7; pp 63-70
6	10/1 & 10/3	Reflexes, Reactions, Control <i>Group 1 – Communicating with Muscle</i>	Leonard Chap 3; pp 70-101
7	10/8 & 10/10	Cerebral Function, Motor Control <i>Group 5 – Neurological Disorders</i>	Leonard, Chap 5; pp Komi-IOC, Chap 13; pp 216-253
8	10/15 & 10/17	Motor & Postural Control, Lab #2 <i>Group 4– Postural Control & Balance</i>	Komi-IOC, Chap 14; pp 254-269
9	10/22 & 10/24	Motor Learning <i>Group 2– Rehab of Neuro Injuries</i>	Leonard Chap 7; pp 146-175
10	10/29 & 10/31	Aging & Development -- Midterm #2	Komi-IOC, Chap 15; pp 270-282
11	11/5 & 11/7	Lab #3, Peripheral Muscle Disorders <i>Group 6– Aging</i>	Latash, Chap 30; pp 301-308
12	11/12 & 11/14	Neurologic Disorders, Spinal Injury <i>Group 3 – Spinal Injuries</i>	Whiting & Zernicke, Chap 8 ; pp 241-286
13	11/26 & 11/28	<i>Visiting Speaker – Motor Control of the</i> <i>eye Dr Brian Sippy, Rocky Mountain Eye</i> <i>Center</i> Motor Rehabilitation	TBA Komi-IOC, Chap 16; pp 283-298
14	12/3 & 12/5	Information processing and reacting faster	Fairbrother, Chap 6; pp 79-98
15	12/10 (Tues)	FINAL EXAM 3:20-5:20 pm.	