

Motor Control

HPHY 333

Spring 2007

Instructors: Dr. Paul van Donkelaar
Office: 348A Gerlinger
Phone: 346-2687
E-mail: paulvd@uoregon.edu
Office Hours: MW 13-14:30

Lectures: Tu/Th 14:00-15:20 pm
240C McKenzie

Labs: M 8:00- 9:50 M 12:00-13:50 M 16:00-17:50
Tu 8:00-9:50 Tu 10:00-11:50 Tu 16:00-17:50
3 SRC

GTF's: Charlene Halterman Tyler Rolheiser Aditi Joshi
346 Gerlinger 346 Gerlinger 340 Gerlinger
346-0275 346-0275 346-0275
chalterm@uoregon.edu trolheis@uoregon.edu ajoshi1@uoregon.edu

Prerequisites: HPHY 313 is the prerequisite for this course. We will build upon and expand on the concepts covered in HPHY 313. Even if you did well in 313, it is advisable that you review material from this course that pertain to upcoming topics in this course, as this background is fundamental to understanding the material covered this term.

Required Text: Shumaway-Cook & Woollacott Motor Control: Theory and Practical Applications. 3rd Edition

Web Page: There is a Blackboard web page for HPHY 333 that contains up to date information about what is going on in the class. In addition, the outline for each lecture will be available at this site. It is suggested that you print out the lecture outline before each class and add your own additional notes as required. Also, information about the labs will be available on the site.

Course Description

In HPHY 333 you will gain a better understanding of how the brain learns and controls movement under normal circumstances. This issue will be addressed both from a neurophysiological and psychological perspective. In addition, different types of movement tasks will be examined including eye movements, arm movements, balance control, and locomotion. The emphasis will be on normal motor control although there will also be some examination of motor deficits observed in clinical populations.

Course Requirements

Reading: You are responsible for the assigned readings from the text and any other materials that may be assigned. It is suggested that you come to class having already read the assigned reading as this will make the lectures more informative for you.

Attendance at Lectures: You will be responsible for all information, lecture content, assignments, and schedule changes presented during lectures. The lectures will be organized around the text but will also include additional material not necessarily found in the text. Therefore, if you can't attend a lecture be sure to find out either from classmates, the GTF's or the instructor about the material that was presented.

Group Discussions: During the lectures we will frequently use group discussion as a means of examining various concepts being presented. Your participation in these discussions will form a portion of your final grade.

Laboratories: During the first 4 weeks of the term there will be lab sessions consisting of activity-based experiments of motor learning and control principles. After each lab you will be required to write up a report summarizing the observations and analysis of the motor task under study. In addition, you should attempt to integrate knowledge derived from lectures as well as other insights. Over the final 6 weeks you will be completing a research project in which you will construct a protocol and collect data to answer a specific question and hypothesis. During these 6 weeks, the lab will be available for your group to come in to collect data. There will be a sign-up sheet for your group to checkout specific equipment for a given time period. The purpose of the research project is to introduce you to hypothesis-driven research and to develop critical thinking skills in motor control as well as to allow you to be creative and explore topics that are of interest to you.

For your projects, you will work in your lab groups. The assignment is to develop a research project for which you can make measurements with equipment available to you in the physiology lab that you have used throughout the term. Your group needs to generate a specific question and hypothesis that you will answer using your methodology. Using your data, your group will then need to interpret the results and draw conclusions based on your data. In order to successfully do this, you will need to do a literature review. Your group needs to be familiar with what the current data and literature says about your topic and what conclusions other investigators have drawn based on their data. Remember, successful research does not always mean that your data supports your hypothesis or coincides with what other investigators have found.

The lab project will count towards a significant component of your final grade. Your grade on the lab project will be based on your individual participation, your group's literature review, preliminary abstract (this is a brief summary of your project including hypothesis, methods, results, and conclusion), and final poster presentation. The poster presentations will be graded based on the information presented in the poster (title, hypothesis, methods, results, discussion, graphs, tables, ease of interpretation, correct interpretation of data) and the group's oral presentation of the poster (showing knowledge of protocol and results, explaining the reasoning behind experimental design, understanding the physiological concepts behind your experiment).

Evaluation: There will be one midterm exam and a comprehensive final exam. Each exam will include both objective and essay questions. The exams, laboratory reports, research project, and group discussion responses will contribute to your final grade in the following manner:

Group Discussions	10%
Midterm I	25%
Labs	10%
Research Project	25%
Final (comprehensive)	30%

Final Grades: The following grading system will be used based on the combined scores in each of the assessments above.

A-/A/A+	90-100%
B-/B/B+	80-89%

C-/C/C+	70-79%
D-/D/D+	60-69%
F	<60%

Course Outline

Week 1: April 3/5

- Introduction to Motor Control/Learning (Ch. 1)
- Lab 1 (Fitts' Law)

Week 2: April 10/12

- Motor Physiology (Ch. 3)
- Lab 2 (EMG and Limb Movements)

Week 3: April 17/19

- Sensory Physiology (Ch. 3)
- Lab 3 (Balance)

Week 4: April 24/26

- Limb Movements (Ch 16, 18)
- Lab 4 (Gait Control)
- Research Project: Your group must turn in a brief proposal of your research project. This should include: names of all group members, a specific question, a rationale, and a specific hypothesis.

Week 5: May 1/3

- Eye Movements (Ch 16)
- Lab – Research Projects
- Research Project: Your group must turn in a brief literature review for your project and an outline of the methods that you will use to answer your question and test your hypothesis.

Week 6: May 8/10

- **MAY 8th – MIDTERM EXAM**
- Posture and Balance (Ch 7, 10)
- Lab – Research Projects

Week 7: May 15/17

- Locomotion (Ch. 12, 14)
- Lab – Research Projects

Week 8: May 22/24

- Motor Learning (Ch. 2 and 4)
- Lab – Research Projects

Week 9: May 29/31

- Stroke and Recovery of Function
- Lab – Research Projects
- Final week for data collection on laboratory projects. Your group must turn in an abstract (brief summary of your data, results, and your analysis of the data, i.e., what conclusions can you draw from the data, physiological relevance, etc.) on Thursday. If you are still collecting data this week, it does not need to be included in your summary.

Week 10: June 5/7

- Clinical Case studies
- Research Project Presentations (Date/Time TBA)

FINAL EXAM

Thursday, June 14th

13:00-15:00

240C McKenzie