WAYNE STATE UNIVERSITY
COLLEGE OF EDUCATION

Division: Kinesiology, Health, and Sport Studies
Program Area: Kinesiology
Course Ref. #: 24123
Course Title: KIN 3550 - Motor Learning & Control
Section #: 001 **Credit Hours:** 3
Term/Year: Winter 2014
Course Location: 0145 Main
Course Schedule: Monday 4:30 PM – 7:15 PM
Instructor: Qin Lai, Ph.D.
Office Address: 10 Main Annex
Office Hours: M: 1:00 PM – 4:00 PM / T: 10:30 AM – 12:30 PM
Office Phone #: 313-577-4246
e-mail: qin_lai@wayne.edu **Website:** http://coe.wayne.edu/kinesiology/index.php

Course Description:

The study of motor skill acquisition and motor control with applications to physical activity. Focus on the cognitive processes and neural mechanisms that contribute to motor learning and control.

Course Topics:

1. Motor Learning and Control: An Introduction
   a. Motor learning, motor control, and other scientific disciplines
   b. Fundamental concepts
   c. Classification of motor skills

2. Measurement of Motor Performance
   a. Reaction time
   b. Error measures
   c. Kinematic and kinetic measures
   d. EMG
   e. Brain Activity Measures

3. Neuromotor Basis for Motor Control
   a. The neurons
   b. The central nervous system and motor control
   c. The neural control of voluntary movement

4. Motor Control Theories
   a. Coordination and degree of freedom
   b. Open-loop and closed-loop systems
   c. Motor program theory
   d. Dynamic system theory

5. Sensory and Motor Control
a. Proprioception and motor control
b. Vision and motor control

6. Performance and Motor Control Characteristics
a. Speed-accuracy skills
b. Bimanual-coordination skills
c. Locomotion

7. Action Preparation
a. Task and situation characteristics
b. Performer characteristics
c. Postural preparation and end-state comfort control

8. Attention and Performance
a. Attention and multiple task performance
b. Focus of attention on performance
c. Visual selection attention, visual search, and performance

9. Memory and Consolidation
a. Working and long-term memory
b. Forgetting and consolidation
c. Strategies of memory enhancement

10. Defining and Assessing Motor Learning
a. Performance vs. learning
b. Performance characteristics of skill learning
c. Learning assessments

11. Transfer of Motor Learning
a. The reason for transfer of learning
b. Positive vs. negative transfer
c. Bilateral transfer

12. Augmented Feedback
a. Type of feedback
b. Feedback frequency on motor learning
c. Feedback bandwidth on motor learning
d. Timing issues related to augmented feedback

13. Practice Condition
a. Practice variability and specificity
b. Distribution of practice and whole-part practice
c. Demonstration and modeling of practice
d. Mental practice

Course Outcomes:
Upon the completion of this course, students should be able to:

1. Demonstrate an understanding of human nervous system functions on motor behavior.
2. Demonstrate an understanding of human motor control theory and application.
3. Demonstrate an understanding of human memory theory on motor behavior.
4. Demonstrate an understanding of the principles of motor control.
5. Demonstrate an understanding of the variables optimizing motor skill acquisition, retention, and transfer.
6. Develop a skill of motor control and learning lab.
7. Develop a skill of the computation and presentation of scientific data.
8. Develop the problem solution and writing skill through reviewing scientific research.

Required Text:
Magill, RA (2013). *Motor learning and performance: Concepts and Application (10th ed.).* New York: McGraw Hill.

Additional References:
Lai, Q., Shea, C. H., Wulf, G., & Wright, D. L. (2000). Optimizing generalized motor program and parameter learning. *Research Quarterly for Exercise and Sport, 71,* 10-24.

Shadmehr, R., & Holcomb, H.H. (1997). Neural correlates of motor memory consolidation. *Science, 277,* 821-825.

Schmidt, R.A., & Wisberg, C.A. (2007). *Motor learning and performance (4th ed.)* Champaign, IL: Human Kinetics.

Method of Instruction:
Lecture, discussion, and lab

Course Assignments:
Two lab assignments and a research assignment are required for the class. The lab assignments will involve data collection and analysis at Motor Behavior Lab, 10 Main Annex. Your participation and lab report will determine your grades on the labs. The research assignment will involve critical review on current research topics in motor control and learning. The grading of the research will focus on the completion and quality of your review paper.

Course Examinations:
Three exams will be scheduled during the semester. Each exam will consist of objective questions and essay questions and cover 4-5 lecture chapters.

Class Policy:
(1) All the students are asked to participate in classes. A student will receive a grade of "F" for this class if he/she misses more than 1/3 of the total classes.
(2) Every assignment should be submitted on time. Late submission is acceptable within one week after the deadline but with 75% maximum possible points.
(3) A make-up can be provided for exams and labs only for medical (or family) emergency, car accident on road to school, or other special situations. It is the student's responsibility to contact

the instructor immediately to schedule a make-up. If a student involves university business on the day of exam or quiz, he/she is expected to reschedule the exam or quiz in advance. However, no make-up is available for the final exam.

Class Schedule:

Date	Content
1/6	Class Orientation
1/13	Chapter 1 – Introduction Chapter 2 – Neuromotor Basis for Motor Control
1/20	*University Holiday*
1/27	Chapter 2 – cont. Chapter 3 – Measurement of Motor Performance
2/3	*Lab 1*
2/10	Chapter 4 – Motor Control Theories
2/17	*Test I (Chapters 1, 2, 3, & 4)*
2/24	Chapter 5 – Sensory and Motor Control
3/3	Chapter 6 – Performance and Motor Control Characteristics Chapter 7 - Action Preparation
3/10	*Spring Break*
3/17	Chapter 7 – cont. Chapter 8 – Attention and Performance
3/24	Test II (Chapters 5, 6, 7, & 8) Lab 2
3/31	Chapter 9 – Memory and Consolidation *Research Assignment Information*
4/7	Chapter 10 – Defining and Assessing Learning Chapter 11 – Transfer of Learning
4/14	Chapter 12 – Augmented Feedback
4/21	Chapter 13 – Practice Condition
4/28	*Test III (Chapters 9, 10, 11, 12, & 13)* *Due: Assignment*

Grading System:
The following will be used to determine grades in this course:

Exams (@3 x 25%)	75%
Research Assignment	10%
Lab Assignments (@2 x 5%)	10%
Class Participation	5%
TOTAL	**100%**

EXTRA CREDIT: Students who have full class participation will be awarded 2% extra credits.

Grades will be determined on a straight scale:

A = 93 – 100% (4.00)		A- = 90 – 92.9% (3.67)	
B+ = 87 – 89.9% (3.33)		B = 83 – 86.9% (3.00)	
B- = 80 – 82.9% (2.67)		C+ = 77 – 79.9% (2.33)	
C = 73 – 76.9% (2.00)		C- = 70 – 72.9% (1.67)	
D+ = 67 – 69.9% (1.33)		D = 63 – 66.9% (1.00)	
D- = 60 – 62.9% (0.67)		F < 60%	(0.00)

Course Drops/ Withdrawal Policy:

Course Drops and Withdrawals: In the first two weeks of the (full) term, students can drop this class and receive 100% tuition and course fee cancellation. After the end of the second week there is no tuition or fee cancellation. Students who wish to withdraw from the class can initiate a withdrawal request on Pipeline. You will receive a transcript notation of WP (passing), WF (failing), or WN (no graded work) at the time of withdrawal. No withdrawals can be initiated after the end of the tenth week. Students enrolled in the 10th week and beyond will receive a grade. Because withdrawing from courses may have negative academic and financial consequences, students considering course withdrawal should make sure they fully understand all the consequences before taking this step. More information on this can be found at: http://reg.wayne.edu/pdf-policies/students.pdf

The last day to withdraw will be at the end of the 10th full week of classes (**March 22, 2014**).

Academic Dishonesty – Plagiarism and Cheating:

Academic misbehavior means any activity that tends to compromise the academic integrity of the institution or subvert the education process. All forms of academic misbehavior are prohibited at Wayne State University, as outlined in the Student Code of Conduct (http://www.doso.wayne.edu/student-conduct-services.html). Students who commit or assist in committing dishonest acts are subject to downgrading (to a failing grade for the test, paper, or other course-related activity in question, or for the entire course) and/or additional sanctions as described in the Student Code of Conduct.

Attention Students with Disabilities:

If you have a documented disability that requires accommodations, you will need to register with Student Disability Services (SDS) for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is

313-577-1851 or 313-577-3365 (TDD only). Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

Please be aware that a delay in getting SDS accommodation letters for the current semester may hinder the availability or facilitation of those accommodations in a timely manner. Therefore, it is in your best interest to get your accommodation letters as early in the semester as possible.

Religious Observance Policy:

Because of the extraordinary variety of religious affiliations represented in the University student body and staff, the Wayne State University calendar makes no provision for religious holidays. It is University policy, however, to respect the faith and religious obligations of the individual. Students who find that their classes or examinations involve conflicts with their religious observances are expected to notify their instructors well in advance so that alternative arrangements as suitable as possible may be worked out.

Student Services:

The Academic Success Center (1600 Undergraduate Library) assists students with content in select courses and in strengthening study skills. Visit www.success.wayne.edu for schedules and information on study skills workshops, tutoring and supplemental instruction (primarily in 1000 and 2000 level courses).

The Writing Center is located on the 2nd floor of the Undergraduate Library and provides individual tutoring consultations free of charge. Visit http://clasweb.clas.wayne.edu/writing to obtain information on tutors, appointments, and the type of help they can provide.