EXPH 1993
Biomechanics and Skill Acquisition
Fall, 2012

Mon, Wed, and Fri: 9:00 – 9:50 AM (Lecture or Lab)
Room 223, Ligon Coliseum (Lecture) – Lab location will be announced prior

Instructor:
Jason Winchester, Ph.D.
Office: 208 Ligon Coliseum
E-mail: jason.winchester@mwsu.edu Please do not attempt to e-mail me via Blackboard. Send all communication directly to my MWSU e-mail account.
Office Phone: x4715 – If you cannot reach me on the phone, please send me an e-mail.

Office Hours:
Mon & Wed: 8:40-9:00 AM, 9:50-10:10 AM, 11:40-12:00 PM, and 12:50-1:10 PM
Wed: 5:30-6:00 PM (Only on days when I am meeting with my graduate class – email me if you are planning to come by)
Fri: 8:40-9:00 AM and 9:50-10:10 AM
*On days where class is cancelled (e.g. holiday, fall break, travel, etc.), office hours will also be cancelled unless otherwise noted.
#Additional office hours are always available by request.

Required Textbook and Readings:

Class Description:
Mechanical, anatomical, and psychomotor analysis of human movement. Emphasis will be placed on structure and function of bone and muscle, statics, dynamics, kinematics, and kinetics. In addition, psychological and physiological characteristics that influence skill learning; behavioral changes related to the stages of skill learning; the influence of various types of practice conditions and feedback on skill acquisition will be examined and related to the utilization of biomechanical, anatomical, and physiological data.

Objectives:
At the completion of this course students should be able to:
1) Describe and define movements and fundamental biomechanical principles using scientific terminology.
2) Define, recognize, and apply concepts of both linear and angular kinematics and kinetics as they apply to the analysis of human movement.
3) Apply biomechanical principles to human movement situations including but not limited to performance, training, rehabilitation, and injury prevention.
4) Apply principles related to internal tissue loading to improving tissue structure and function, and to injury prevention.
5) Describe human skeletal articulations in relation to their movement capabilities.
6) Describe the relationship of the musculotendinous unit to muscle function.
7) Identify muscle function in producing upper and lower extremity movements.
8) Identify muscle function in producing movements of the spine.
Class Policies and Student Conduct:

✓ Attendance is not required (for the lecture), however it is imperative for success in this class. The student is responsible for any information presented, discussed and assigned in class regardless of whether or not the student was present. Make-up tests, quizzes, assignments, or other grades will be granted for excused absences only:

- serious illness (doctor’s note required)
- official university excused absences (with proper documentation and prior notification)
- extenuating AND unusual circumstances (PRIOR approval should be obtained or direct contact made with the instructor within 24 hours of the event). Whether or not specific circumstances qualify as both extenuating AND unusual is at the discretion of the instructor on a case by case basis. Note: minor illness (cold, flu, etc.) is neither extenuating or unusual.
- Documentation of the reason for any absence must be provided to the instructor.
- In emergencies where advance notification is not possible, the student must contact the Dean of Students to initiate an official request for an excused absence (940-397-4291).
- Please be aware that any student who does not attend the lecture during the initial drop/add phase and has not communicated with me is subject to being administratively dropped from the roster. Roll will be taken up until the last day to add a class only (in the lecture) per university policy. Roll will be taken for the entire semester in the labs.

✓ Late assignments will not be accepted for any reason barring the guidelines described above.

✓ When contacting the instructor in reference to class issues via e-mail (jason.winchester@mwsu.edu) or other method (for example a note in my mail box or on my office door), if you do not receive confirmation that I have received your message, project, etc., within a reasonable time period (2 work days), then I did not get it! In other words, if you do not hear back from me, please follow up to make sure we are communicating effectively!

✓ I do not check or respond to my work e-mail on weekends, holidays, or past the close of business during the week. In other words, if you write me an e-mail on Friday night, don’t expect to hear back until sometime on Monday or Tuesday.

✓ Please check Blackboard and your MWSU e-mail account prior to coming to class. If I am ill or there is a change in the class location, materials required, or meeting time, I will send an e-mail out via Blackboard to all of your student accounts.

9) Identify anatomical landmarks, surface markings, and various soft tissue structures by palpating a live model.
10) Show the application of motor learning principles by defining "skill" and identifying various skill classifications.
11) Using the concept of “Stages of processing” utilized by psychologists, describe the information processing stages as it relates to motor learning and performance.
12) Apply motor learning, behavioral and social laws and principles in the learning and teaching of a novel motor skill and in the application of biomechanical, anatomical, and physiological data.
13) Explain how the structure of the learning experience relates to the development of skillful movement for all learners.
14) Develop high competency in the utilization of feedback protocols to enhance learning, transfer of skill, and improvement of kinematics and kinetics.
Students are strongly encouraged to ask, and respond to, questions in class, because this identifies problem areas for the instructor.

It is also recommended that every day after class you go through and review and organize the notes you have taken, rectifying the material with what you have read in the text. Preparation immediately before the examinations is greatly facilitated by this process.

Students are always encouraged to come to office hours in order to ask additional questions on the material or to gain a better understanding of grades on exams or assignments.

Please understand that slides are an outline and do not represent all of the information which will be covered in class. If we talk about topics in class, unless I specify otherwise, they are fair game for exam material. If there is something that comes up in class discussion which you do not understand, please be sure to let me know so that I can slow down and help you get it right.

Student employment does not take priority over academic obligations. This includes graduate assistantships. I recognize that many students need to work in order to meet expenses, however, there are distinct guidelines for students in terms of the number of credit hours which should be attempted based on how many hours per week a student has outside employment. If you have questions about this, please see your student handbook.
**Evaluation:**

**LAB ASSIGNMENTS AND ACTIVITIES:**
Throughout the semester, there will be lab activities mixed in with the lecture sessions. There will be somewhere between 2 – 6 labs, depending on topics, and class progress. Each lab will be worth 15 points. While the lab data collection may be done in small groups, lab reports will need to be done by each individual. Plagerism detection software will be used to ensure that work is original and belongs to each student.

Each lab report will be related to the topic at hand and will comprise of a 4-6 page, times new roman 12 point font, double spaced, discussion of the topic. Actual questions and topics will be provided to the students at the time of the lab sessions. Students will need to cite a minimum of 4 references from peer reviewed scientific journals which are indexed on Pub Med. Students requiring help using PubMed are encouraged to see me for help or to seek help from one of the reference librarians on campus.

Students who are not in class within the first 5 minutes will not be allowed to participate in the labs which means that they will not be able to turn in a lab report and will lose all points associated with that particular lab. Students who miss class without a university excused absence, will not be allowed to make up the lab or turn in a lab report. Arrangements will be made to accommodate those students who miss class with a university excused absence.

**EXAM REVIEWS:**
As time allows in class and depending on class progress in each unit, a review may be offered before each exam. At that time, students can ask any content question that they would like. Students are not required to participate in the review, and can stay or leave as they choose. If there are no questions related to the content of the unit, the review session will be ended. Whether or not a review is conducted in class depends of class progress through the material for each unit and class participation in previous reviews. If there is no time to have a formal review or, if review sessions are not being utilized, students will need to come to office hours to address any questions on class material.

**UNIT EXAMS:**
There will be 2 exams worth 50 points each. Content for the exam will come from class discussion and your readings/textbook. Our exam may be in multiple choice and/or short answer format. Students are required to bring a ScanTron form (# 882-E) in order to sit for the exam along with something to write with. Any student who does not have the correct ScanTron form and/or proper writing implements will not be allowed to sit for the exam. Including handing out of exams and any announcements, you will have the remainder of the class period to complete the exam.

Please return exams promptly when time is called. Students who give prior notification for a university excused absence will be allowed to complete an alternate version of the exam outside of class. However, students who are allowed to sit for an alternate version of a particular exam should be aware that I will not be able to calculate reliability due to small sample size. Thus, any questions which may have shown up as unreliable during normal testing will not be discovered, and students will be required to accept the grades earned sans reliability testing.

Students who miss an exam for what would not be considered a university excused absence or who do not give prior notification of excused absences will not be allowed to take the exam at an alternate time. Exams one and two will be given during normal class times and exam three will be given during our final
exam period.

EXAM/ASSIGNMENT PICKUP:
For privacy reason, students are not allowed to pick up exams or assignments for other students without my having prior written permission from the student who’s exam is being collected. If you have extenuating circumstances and wish to e-mail me permission prior to handing back materials, I will be more than happy to allow the person designated in your letter to pick up your work.

Students will have 1 week to return exams to me following my handing them back (for exams 1 and 2). All students are encouraged to check the answer key to be sure that their exams are graded correctly. Any student who feels that a question could have been answered differently is encouraged to let me know so that we can talk about it. If the student can make a compelling case for why a particular question could have more than one correct answer, additional points may be awarded on a case by case and student by student basis. Students who do not turn in their exams to me within 1 week will suffer a 10% grade reduction off of their total points for each day the exam is late unless the student has a university excused absence.

Due to exam 2 being given during finals week, students will need to come to announced office hours to review their exams. Office hours for finals week will be announced as we approach the latter part of the semester. Once those office hours are over, grades will be submitted and will not be altered. All students are encouraged to come to the office hours provided to review their exams, check their grades, and resolve any issues that may have developed.

EXAM QUESTION RELIABILITY:
Once I receive exam 1 back from students and all grade disputes have been discussed and resolved, I will run statistical reliability tests on every question. If any questions is found to be unreliable in the top 33% of the class by percentage grade, that question will be removed from grade calculation and all students who missed that particular question will be credited for those points. Students who got the question correct will not be credited any additional points. Students who need to take an alternate version of the exam will not have their exam questions tested for reliability due to small sample size.

EXAM GRADE CURVES:
Following assessment of question reliability, on unit exams 1 and 2, a curve will be applied which consists of ½ of the difference between the class mean’s percent grade and 100%. For example, if the class mean for exam one is 50%, I will add points until the class mean equals 75%. If the class mean for exam two is 60%, I will add points until he class mean equals 80%. Regardless of class mean prior to application of a curve or the magnitude of curve applied, no student will be given a curve to the point that any exam or semester grade is over 100%. Any student who misses the exam without a university excused absence will not receive any curve that may be given to the remainder of the class.

POINTS POSSIBLE BREAKDOWN:
2 – 6 Lab assignments (15 points each) = 30 – 90 Points
Exams (50 points each) = 100 Points

*Total points possible = 130 – 190 Points
**GRADING SCALE:**
Student’s letter grade is based on the individual point score converted into a percentage grade. Based upon the student’s class performance the following letter grades will be assigned:

- $90 - 100\% = A$
- $80 - 89.99\% = B$
- $70 - 79.99\% = C$
- $60 - 69.99\% = D$
- $< 60\% = F$

**GRADING CONCERNS:**
Students who feel there is a grading error or who wish to gain greater knowledge as to why a particular grade was earned have 1 week following the date exams or papers are handed back to the class to express their concerns. Following this period, all grades are set and will not be altered. Students are encouraged to come and look at their grade on proposals and presentations prior to submission of final course grades. Office hours will be announced in order to facilitate that process. After grade submission is complete, no grade alterations will be made so please come by during office hours or make an appointment to see me at another time if you have concerns.

NO STUDENT WILL BE THOUGHT OF ANY DIFFERENTLY OR PUNISHED IN ANY WAY FOR BRINGING A POTENTIAL GRADE CONCERN TO MY ATTENTION AS LONG AS THINGS ARE HANDLED IN A RESPECTFUL MANNER. I want all students to walk away with an understanding of why you earned the grade that you did. In addition, I want to make sure that any potential mistakes in grading on my part are taken care of immediately. I encourage ALL students to take advantage of opportunities to discuss their grades with me throughout the semester. I cannot treat you 100% fairly if you do not let me know about problems as they arise. Please keep me in the loop and I will make every effort to return the favor.
Assumption of risk:
As with any activity there is an assumed risk while participating. We will do all we can to provide a safe environment; however, you are ultimately responsible for your well-being. The university will not be held liable for any injuries that occur.

Any student who has a documented medical condition, (e.g. Asthma, Hypertension, Cardiac Condition, etc.), or any injury that may preclude participation in a specific activity should inform the instructor immediately.
Arrangements will be made with an alternate activity for your participation.

ADA Policy Statement:
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities, including a requirement that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. Students who have special needs as a result of a disability and require accommodations, must contact the Disability Services Office at 940-397-4140 and notify the instructor as soon as possible.

Students are also encouraged to seek assistance as needed from the Midwestern State University Counseling Center at 940-397-4618.

Academic Integrity:
As commonly defined, plagiarism consists of passing off as one’s own the ideas, words, writings, etc. that belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research and academic discourse cannot be safely conducted.

Plagiarism, cheating, and other forms of academic dishonesty are prohibited. Students guilty of academic misconduct, either directly or indirectly through participation or assistance, are immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions which may be imposed through the regular institutional procedures as a result of academic misconduct, the instructor has the authority to assign an "F" or a zero for the exercise or examination, or to assign an "F" in the course. As noted above, plagiarism detection software will be used throughout this course.

Student Honor Creed

As an MSU Student, I pledge not to lie, cheat, steal, or help anyone else do so."

As students at MSU, we recognize that any great society must be composed of empowered, responsible citizens. We also recognize universities play an important role in helping mold these responsible citizens. We believe students themselves play an important part in developing responsible citizenship by maintaining a community where integrity and honorable character are the norm, not the exception. Thus, We, the Students of Midwestern State University, resolve to uphold the honor of the University by affirming our commitment to complete academic honesty. We resolve not only to be honest but also to hold our peers accountable for complete honesty in all university matters. We consider it dishonest to ask for, give, or receive help in examinations or quizzes, to use any unauthorized material in examinations, or to present, as one's own, work or ideas which are not entirely one's own. We recognize that any instructor has the right to expect that all student work is honest, original work. We accept and acknowledge that responsibility for lying, cheating, stealing, plagiarism, and other forms of
academic dishonesty fundamentally rests within each individual student. We expect of ourselves academic integrity, personal professionalism, and ethical character. We appreciate steps taken by University officials to protect the honor of the University against any who would disgrace the MSU student body by violating the spirit of this creed. Written and adopted by the 2002-2003 MSU Student Senate.

**Tobacco policy:**
Midwestern State University seeks to provide a safe, healthy, pleasant environment for its faculty, staff, and students. To this end, the use of tobacco products, including smoke and smokeless tobacco, and the advertising, sale, free distribution, and discarding of tobacco products shall be prohibited in all indoor and outdoor facilities and in all university vehicles. The policy extends to faculty, staff, students, vendors, guests, and visitors.

Anyone using tobacco products in class will be asked to leave. If it is a lab session or other in class project, the student in question will lose points for the lab for that day along with the one possible point for attendance. If it is an exam day the student in question will not be allowed to sit for the exam.

Additional information on the MSU tobacco policy may be found here: [http://students.mwsu.edu/recsports/tobacco.asp](http://students.mwsu.edu/recsports/tobacco.asp)

**Final comments:**
If a student does not understand an assignment, what is expected of him/her, or is having difficulty mastering the material/skills covered as a part of this class, I am available to help! I have an “open door” policy and students are always encouraged to call or e-mail me for an appointment, or to just come by my office at any time. I will be more than happy to assist any student whom is having difficulty and requests help, or who just wants to dig deeper into the class material. Please let me know if you are having any difficulty at all and do not wait until you are past the point of no return to seek help. Many students in the past could have had better grades had they come and talked with me earlier rather than later upon recognition that there was a problem. *I can’t help you if I don’t know there is a problem!*

The instructor reserves the right to make changes to the course syllabus and/or schedule at any time. Students will always be informed of any changes made.
Tentative schedule:

Week 1,
- Aug 27th: Course introduction
- Aug 29th: Lecture, lab, and discussion
- Aug 31st: Lecture, lab, and discussion

Week 2
- Sep 1st: No Class – Labor Day
- Sep 3rd: Lecture, lab, and discussion
- Sep 5th: Lecture, lab, and discussion

Week 3
- Sep 10th: Lecture, lab, and discussion
- Sep 12th: Lecture, lab, and discussion
- Sep 14th: Lecture, lab, and discussion

Week 4
- Sep 17th: Lecture, lab, and discussion
- Sep 19th: Lecture, lab, and discussion
- Sep 21st: Lecture, lab, and discussion

Week 5
- Sep 24th: Lecture, lab, and discussion
- Sep 26th: Lecture, lab, and discussion
- Sep 28th: Lecture, lab, and discussion

Week 6
- Oct 1st: Lecture, lab, and discussion
- Oct 3rd: Lecture, lab, discussion, or review 1
- Oct 5th: Lecture, lab, discussion, review 1, or exam 1

Week 7
- Oct 8th: Lecture, lab, discussion, review 1, or Exam 1
- Oct 10th: Lecture, lab, discussion, review 1, or Exam 1
- Oct 12th: Lecture, lab, discussion, review 1, or Exam 1

Week 8
- Oct 15th: Lecture, lab, discussion, or Exam 1
- Oct 17th: Lecture, lab, and discussion
- Oct 19th: Lecture, lab, and discussion

Week 9
- Oct 22nd: Lecture, lab, and discussion
- Oct 24th: Lecture, lab, and discussion
- Oct 26th: Lecture, lab, and discussion

Week 10
- Oct 29th: Lecture, lab, and discussion
- Oct 31st: Lecture, lab, and discussion
- Nov 2nd: Lecture, lab, and discussion
Week 12
- Nov 5th: Lecture, lab, and discussion
- Nov 7th: Lecture, lab, and discussion
- Nov 9th: Lecture, lab, and discussion

Week 13
- Nov 12th: Lecture, lab, and discussion
- Nov 14th: Lecture, lab, and discussion
- Nov 16th: Lecture, lab, and discussion

Week 14
- Nov 19th: Lecture, lab, and discussion
- Nov 21st: NO CLASS - Thanksgiving Holiday
- Nov 23rd: NO CLASS – Thanksgiving Holiday

Week 15
- Nov 26th: Lecture, lab, and discussion
- Nov 28th: Lecture, lab, and discussion
- Nov 30th: Lecture, lab, discussion, or review 2

Week 16
- Dec 5th: Lecture, lab, discussion, or review 2
- Dec 7th: Lecture, lab, discussion, or review 2
- Dec 9th: Lecture, lab, discussion, or review 2

Exam 2: Wed, December 12th, 3:30 – 5:30 PM

* Actual weekly schedule may fluctuate depending on class progress

STUDY HINTS FOR LEARNING MUSCLE ATTACHMENTS AND ACTIONS

Students are advised to do a minimum amount of pure memorization. "Think through" the information to be learned. Apply concepts learned in class. What makes sense? Use common sense.

1. Familiarize yourself with general locations, names, and appearances of the muscles you will be learning. You should be able to identify each muscle to be studied on a wall chart or in the illustrations in your book before proceeding.

Remember that the name of a muscle often tells you something about the muscle itself:

a) attachments
digitorum - attaches to the digits (toes or fingers)
digitii minimi - attaches to little toe or little finger
hallucis - attaches to the big toe
pollicis - attaches to the thumb
plantar - pertains to the sole of the foot
palmar - pertains to the palm of the hand
carpi - attaches to the wrist
capitis - attaches to the head
cervicis - attaches to the cervical region or neck
thoracis - attaches to the thorax
lumborum - attaches to the lumbar region

b) number of divisions biceps, triceps, quadriceps
c) location tibialis, femoris, anterior, ulnaris, posterior, profundus (deep)
d) direction of fibers rectus (straight), oblique, transversus
e) shape deltoid (triangular), trapezius (kite), rhomboids, quadratus
f) action flexor, levator, tensor (tense a part), pronator
g) length or size brevis, longus, major, minor

2. Try to determine what bones each muscle attaches to from the knowledge gained in step one. Do not learn too many details about muscle attachments at first. Once you are familiar with the general bones of attachment, you should learn more specific attachments so that you can accurately describe the line of pull of the muscle.

3. Try to determine the actions of each muscle from your knowledge of the following:
   
a) General location of the muscle (i.e., anterior, posterior, medial, lateral, etc.). Generally, anterior muscles produce anterior movements, medial muscles produce medial movements, and so on. Muscles do not usually perform both actions that are antagonistic to each other (i.e., a muscle would not usually flex and extend at the same joint). Once you know the general rule, then it will be easy to learn the specific exceptions to the rule.

b) The joints crossed by the muscle. In order to produce action at a joint, a muscle (or more often, its tendon) must cross over the joint. Some muscles cross more than two joints; as a general rule, muscles produce actions at all joints that they cross.

c) The relation of the muscle's line of pull to the center of the joint. If a muscle's line of pull is anterior to a joint, then the muscle will definitely cause an anterior movement unless some other force (external or another muscle) overcomes its force production.

d) The possible axes of motion of the joint as determined by the structure of the joint itself.
   EXAMPLE: Hinge joints only allow flexion and extension movements. Even if the line of pull is medial, medial movement (adduction) will not occur because of the joint structure.

4. You should try to determine the muscles that produce each possible movement at each joint. In other words, determine which muscles belong to which functional muscle groups. Remember that muscles usually work in groups rather than alone. A muscle can belong to more than one functional muscle group, although a muscle does not usually belong to two groups that are antagonistic to each other (e.g., a muscle would not usually belong to both the flexors and extensors of the knee).

You will probably go back and forth between steps 2 and 3. Knowledge of muscle attachments will help you
better understand muscle lines of pull and the actions that the muscles produce. However, knowledge of actions of the muscles can help you better remember muscle attachments as well.

Study in as many different ways as possible, using flash cards, muscle models, muscle diagrams (individual and group), skeletons, and palpation of muscles. Group the muscles as much as possible according to action, specialized functions, attachments, and locations. When the actions and attachments make sense, you will be more likely to remember them.