

The University of Texas at Tyler
Course Syllabus – Fall 2009

Subject and Number: KINE 3334-01

Meeting Times: Tuesday Thursday 11:00-12:15

Location: HPC 03055

Credit Hours: 3

Instructor: Matt Owings, M.S., C.S.C.S.

Office: HPC 02165

Texts: Hall, Susan J., Basic Biomechanics 2006 5th ed. McGraw Hill.

Sieg and Adams Illustrated Essentials of Musculoskeletal Anatomy 2009 5th ed. Megabooks.

Subject Description: Biomechanics is an interesting course that encompasses several fields of study. Generally speaking, biomechanics examines the way the laws of physics apply to biological systems such as the human body. Better stated, we might say biomechanics examines the way the body obeys the laws of physics.

Biomechanics is involved in engineering any time there is a human-machine or human-to-object interface. This would include the design of sports equipment such as running shoes, football helmets or gymnasium floors. Biomechanists also help design automotive and aircraft interiors and controls, hand tools and workout equipment.

Biomechanics is also closely linked with the study of anatomy. Biomechanics is involved in the development of surgical techniques, fixation strategy for fractures, therapy for soft tissue injuries, and the design of prostheses.

In addition, biomechanists apply the principles of physics to human movement such as athletic activities or work tasks in order to optimize them with respect to improve performance and to reduce risk of injury.

Course Description: This course will cover three general areas:

- Kinematics – the study of motion. Kinematics describes motion but does not analyze the forces that cause motion. Skeletal anatomy will be included in this section.
- Kinetics – the study of forces. The study of kinetics will rely on a knowledge of kinematics. Muscular anatomy will be included in this section.

- Electromyography (EMG) – the non-invasive measurement of neuromuscular activity.

All three of these topics will be covered in lecture, and kinematics and kinetics are well covered in Hall. In addition, musculoskeletal anatomy is covered in an easy to understand way in your Illustrated Essentials text, plus some anatomy will be covered in lecture also.

Exams: This course will include three exams plus a final. The first exam will cover kinematics and body segments. Exams two and three will incorporate kinetics and EMG, plus appropriate kinematics for the stated problems.

Each exam will consist of two parts. Part one of each exam will be a multiple choice or true-false section. Part two of each exam will consist of problems to be solved.

The final exam will be a comprehensive exam over all topics covered in the course. The final exam will test the student on subject matter he or she should retain from the course. The grade on the final exam cannot lower the student's average....in other words the final can't hurt you....but it can help you if you do well on it.

Homework: The nature of the material covered in biomechanics is such that some of it is best learned by working problems outside of class, hence, there will usually be a homework set assigned each week. These homework sets may come from your text or they may be class handouts or internet postings.

Grades: Grades for the lecture section will consist of:

Exam 1 – 25%
Exam 2 – 25%
Exam 3 – 25%
Homework – 25%

If the final exam grade is higher than this average, the grade will be:

Exam 1 – 20%
Exam 2 – 20%
Exam 3 – 20%
Final – 20%
Homework – 20%

89.5-100% = A
79.5-89.5 = B
69.5-79.5 = C
59.5-89.5 = D
<59.5 = F

Cell Phones: Average cell phone usage is 450-500 minutes per month. Average cell phone call length is 3 minutes 15 seconds. That means 146 calls per month. Let's assume 73 calls are incoming. If 73 calls per day are incoming, the probability of receiving a call in any hour are $73/30/24$...the chance of receiving a call during any given hour are 0.1014. That means there is a 0.8986 chance there will be no call to that phone. If 30 such phones are taken as a group, the chance of none of them receiving a call within a given hour is 0.8986^{30} . The chance of there being no incoming call in the group of 30 phones is 0.04, or a 4% chance of the class not being interrupted by a ringing phone. So, please silence your cell phone prior to the start of class!

Tentative Schedule (Fall 2009 by week):

8/24-8/28 – Class organization, description of biomechanics, observation, Anthropometry (body segment lengths).

8/31-9/4 – Kinematics, observations of position, distance and displacement (rectilinear), bone.

9/7-9/11 – Kinematics, observation of speed, velocity, acceleration (rectilinear), bones.

9/14-9/18 – Kinematics, observation of position, distance and displacement (angular), joints.

9/21-9/25 – Kinematics, observation of speed, velocity and acceleration (angular), joints.

9/28-10/2 – Review and Exam 1

10/5-10/9 – Kinetics (definition of force, weight, inertia, momentum – rectilinear), muscle, EMG

10/12-10/16 – Kinetics (rectilinear dynamics), connective tissue

10/19-10/23 – Review and Exam 2

10/26-10/30 – Kinetics (Torque, angular concepts, statics)

11/2-11/6 – Kinetics (statics, stability), muscle, EMG, posture

11/9-11/13 – Kinetics (spinal kinetics, lifting), spinal anatomy

11/16-11/20 – Kinetics (Center of mass, angular movement)

11/23-11/27 – Thanksgiving week – out of class assignment

11/30-12/4 – Review, Exam 3

12/7-12/11 – Miscellaneous topics, review

12/14-12/18 – Final Exams