

KINE 3334 - Biomechanics and Anatomical Kinesiology

Course Syllabus

Instructor: Dr. Fan Gao

Email: Fan_Gao@uttyler.edu

Tel: 903-565-5615

Office: HPC 2166

Lab location: HPC 2165

Office hours: MWF 11:30 am - 12:30 pm or by Appointment

Semester: spring 2009

Website: <http://www.blackboard.uttyler.edu/>
<http://www.mhhe.com/hall5e>

Lecture: W 17:00 – 19:40 pm HPC3055

Lab: F 9:30 – 11:30 am; 12:30 – 2:30; 2:30 – 4:30pm

Textbook

Hall, S.J. (2006). Basic Biomechanics (5th ed.). McGraw-Hill.

Seig, K. & Adams, S. (2002). Illustrated Essentials of Musculoskeletal Anatomy. (4th ed.). Megabooks, Inc.

Course description

Analysis of human movement, applying principles from Newtonian mechanics and study of structure and function of major joints and muscle groups. Co-requisite: KINE 3135. Prerequisite: Credit in anatomy and physiology courses or consent of instructor.

Course objectives

- i. To describe the nature of vector quantities and be able to combine and resolve two-dimensional vectors.
- ii. To define the basic terms involved in kinematics (e.g. velocity, acceleration, etc.)
- iii. To explain the kinematic relationships between linear and angular motion
- iv. To use concepts of kinematics to analyze human motion
- v. To define basic terms involved in the kinetics of linear motion (e.g. force, inertia, momentum, etc.)
- vi. To identify the important characteristics of forces (e.g. magnitude, direction, point of application, components)
- vii. To state Newton's laws of motion and relate them to sports activities
- viii. To explain the effects of significant forces encountered in biomechanical analysis
- ix. To explain the significance of the impulse-momentum, work-energy and conservation of momentum relationships to sports activities
- x. To describe the behavior of projectiles
- xi. To define basic terms involved in the kinetics of angular motion (e.g. angular momentum, moment of inertia, torque)
- xii. To locate the center of gravity of an individual
- xiii. To explain the kinetic relationship between linear and angular motion
- xiv. To determine the mechanical factors basic to the performance of an observed movement, and to evaluate the performer's technique

Course Requirements

A scientific calculator that can perform trigonometric functions is required for this class. Cell phones/pagers will not be allowed in tests or exams. Attendance is mandatory for all lecture and lab sessions. The lab assignment will not be graded for the corresponding missing lab session and one final point will be deducted for each absence of lecture.

Reading Assignments

Assigned readings are limited to designated sections in the required textbook, and/or to handouts, and assignments found in the class web page.

Quizzes

An in-class quiz lasting about 10-15 min will be given at the beginning of the class each week covering the previous week lecture material. No makeup is allowed for the in-class quizzes so you are advised to attend each class.

Evaluation

The student will be evaluated based on the performance on examinations (one midterm and one final exam), weekly quizzes and class participation.

Grading system

Course grade will be calculated as a percentage of total possible points

<i>Midterm exam</i>	160 pts
<i>Final exam</i> <i>(comprehensive)</i>	200 pts
<i>Weekly quizzes (12)</i>	240 pts (20 pts each)
<i>Lab assignment (10)</i>	250 pts (25 pts each)
<i>Group project</i>	150 pts
<i>Total possible points</i>	1000 pts

Grading Scale: A = 90 – 100%; B = 80 – 89%; C = 70 – 79%; D = 60 – 69%

Policy on Makeup Assignments/Labs, Tests and Examinations

Makeup of missed in class assignments or tests will only be considered under the following conditions and within 3 days of the original due date:

- i. *Illness.* A medical excuse with signature of a physician must be presented.
- ii. *Athletic or other UT Tyler sponsored trips.* Travel dates and times with a signed memo from the supervisor must be presented to the instructor prior to the absence.
- iii. *Religious Holy Days.* A holy day is observed by a religion whose places of worship are exempt from property taxation under section 11.20, Tax Code.
- iv. *Extenuating circumstances.* It is the prerogative of the instructor to approve the makeup.

Note: In all of the above cases, the instructor must be notified of the absence prior to the class assignment, test, or exam.

Grade Replacement

If you are taking this course for a grade replacement, you must file an intent to receive grade forgiveness with the registrar by the 12th day of class. Failure to do so will result in both the original and repeated grade being used to calculate your overall grape point average. A student will receive grade forgiveness (grade replacement) for only three (undergraduate student) or two (graduate student) course repeats during his/her career at UT Tyler. (2008-2010 Catalog, p. 26)

Academic Dishonesty

Academic dishonesty is a serious offense which includes but is not limited to cheating on exams and plagiarism. The student will receive zero in this course if academic dishonesty is proven.

Food and drink in classrooms

Consumption of food and drink in university classrooms is prohibited.

Disability Support Services

If you have a disability, including a learning disability, for which you request disability support services/accommodation(s), please contact Ida MacDonald in the Disability Support Services office so that the appropriate arrangements may be made. In accordance with federal law, a student requesting disability support services/accommodation(s) must provide appropriate documentation of his/her disability to the Disability Support Services counselor. For more information, call or visit the Student Services Center located in the University Center, Room 282. The telephone number is 566-7079 (TDD 565-5579). Additional information may be obtained at the following link:

<http://www.uttyler.edu/disabilityservices>.

Lecture Schedule

Section I Chapters 1-3

Jan 12th Chapter 1 What is Biomechanics?

Jan 14th & 21st Chapter 2 Kinematic Concepts for Analyzing Human Motion

Jan 26th & 28th Chapter 3 Kinetic Concepts for Analyzing Human Motion

Section II Chapters 10-13

Feb 2nd & 4th Chapter 10 Linear Kinematics

Feb 9th & 11th Chapter 11 Angular Kinematics

Feb 16th & 18th Chapter 12 Linear Kinetics

Feb 23rd & 25th Chapter 13 Equilibrium

Mar 2nd & 4th Chapter 14 Angular Kinetics

Mar 16th Midterm Exam

Mar 18th Midterm Review

Section III Chapters 4-6

Mar 23rd & 25th Chapter 4 Human Bone Growth and Development

Mar 30th & Apr 1st Chapter 5 Skeletal Articulations

Apr 6th & 8th Chapter 6 Human Skeletal Muscle

Section IV Chapters 7-9

Apr 13th & 15th Chapter 7 Upper extremity

Apr 20th & 22nd Chapter 8 Lower extremity

Apr 27th Review session

Apr 29th Group project presentation

Final Exam (TBA)

Lab Session Schedule

Week 1 LAB 0: Review of Algebra and Trigonometry

Week 2 LAB 1: Linear Kinematics – Running Kinematics

Week 3 LAB 2: Projectile Motion

Week 4 LAB 3: Kinematic Relationships

Week 5 LAB 4: Rotational Kinematics

Week 6 LAB 5: Linear Kinetics

Week 7 LAB 6: Biomechanics Literature

Week 8 LAB 7: Angular Momentum

Week 9 LAB 8: Center of Mass (a.k.a. Center of Gravity) of the Body

Week 10 LAB 9: Static Strength

Week 11 LAB 10: Electromyography

Week 12-14 Group project

Week 15 Group project presentation