KINE 3050.002 – Biomechanics

COURSE SYLLABUS

Instructor:	Jakob L. Vingren, Ph.D.
Office Location:	PEB 210-C
Office hours:	TR 4-5PM
	By appointment (preferred)
Contact Information:	(940) 565-3899
	jakob.vingren@unt.edu
	Please include KINE 3050.002 in the title of all emails
Email response policy:	I will attempt to answer all emails within 24 hours on Mon-Fri. Students must use their UNT e-mail for any sensitive information – I will not respond with specific student information to e-mails originating from other accounts.
Online:	This class has a section on UNT's Blackboard. USE IT!!!
Lecture Schedule:	TR: 2:00PM-3.20PM
Recitation (optional):	TR: 3.30PM-4.00PM (PEB 206)
Lecture Location:	PEB 216
Required Textbook:	McGinnis, PM. Biomechanics of Sport and Exercise, 2nd ed., 2005.
	OR Hall SJ. Basic Biomechanics, 5th edition.
Additional Resources:	http://www.mhhe.com/hall5e
Course Description:	*Biomechanics* is an introductory course designed to educate kinesiology students on the basic principles of biomechanics and their applications to human movement. This course will involve the analysis of efficient movement through a study of mechanical and anatomical principles and their application to human movement.
Prerequisite(s):	BIOL 2301/2311 (human anatomy), or consent of instructor. Basic mathematics skills (algebra, geometry) are needed to successfully complete this course.
Special accommodations:	Please contact me as soon as possible if you need special accommodations for classes, assignments, or exams. You must register with the UNT Office of Disabilities accommodation before any special accommodation can be made.

Please keep all cellular devices turned off during class, that also means no-reading or sending texts etc. They are distracting to the instructor and your fellow students. Please see me if you must keep your phone on during class due to potential medical emergencies.

Course Objectives: **Understand the mechanical aspects of human motion:**

1. Use physical laws of motion to quantitatively and qualitatively analyze human motion and performance.
2. Use physical laws of motion to solve problems of human motion.
3. Gain understanding of the relationship between mechanical properties and anatomical functions.
4. Understand how biomechanical principles can be applied to examine human activities such as sport.

Course Activities **Examine mechanical properties and how these affect human motion**

- Relate specific physical parameters to human motion, e.g.: force, velocity, acceleration, momentum, torque etc. A specific example: Understanding how muscle force vectors translate into torque generation at specific joints to effect motion (linear & angular).
- Examine biomechanical principles by solving quantitative questions regarding motion. Throughout the semester we will apply mathematics to the physical parameters of specific human motions to achieve an overall understanding of biomechanics.
- Examine how specific anatomical structures affect movement.
- Relate all of the above to everyday activities, especially sport related activity.

As a result, this course will necessarily draw upon a variety of disciplines including: Anatomy, Physiology, Mathematics, and Physics.

Course Schedule:

Week	Topics and Exams	Reading etc.	Quizzes and Assignments
1-2 (8/27& 9/1)	Class outline/syllabus Introduction	Introduction Appendix A	
	External Biomechanics		
2-3 (9/1 & 9/8)	Forces Trigonometry refresher	Ch.1 Blackboard	
4 (9/15)	Linear Kinematics	Ch.2	Quiz 1 (Tuesday 9/15)
5 (9/22)	Linear Kinetics	Ch. 3	Quiz 2 (Thursday 9/24) Exam 1 questions due (Thursday 9/24)
6 (9/29)	***Exam 1 (Tuesday 9-29)***		
6-7 (9/29 & 10/6)	Work, Power, Energy	Ch. 4	
7 (10/6)	Torques & Moments	Ch. 5	
8 (10/13)	Angular Kinematics	Ch 6	Quiz 3 (Tuesday 10/13)
9 (10/20)	Angular Kinetics	Ch. 7	Quiz 4 (Thursday 10/22) Exam 2 questions due (Thursday 10/22)
10 (10/27)	***Exam 2 (Tuesday 10/27)***		
	Internal Biomechanics		
10-11 (10/27 & 11/3)	Joints, Bone & Tissue Stress	Ch. 9, 10	
12-13 (11/10 & 11/17)	Ligament & Tendon	Ch. 15	Quiz 5 (Thursday 11/19)
13-15 (11/17, 11/24 & 12/1)	Muscle	Ch. 11,12	Quiz 6 (Thursday 12/3) Paper review due (Thursday 12/3)
	Functional Biomechanics		
16 (12/8)	Technology in biomechanics	Ch. 16	Exam 3 questions due (Thursday 12/10)
17 (12/15)	***Exam 3 (Final, 12/15; 1:30 p.m. - 3:30 p.m.)***		

Reading Assignments

Please note: The reading assignments listed in this syllabus are intended to *supplement* the lecture materials. Some of the material in the text will **not** be covered in lecture but may be included on the exams. By the same token, all of the information given in lecture will **not** be found in the text, but may also be included on the exams. I recommend that you read the assigned sections in the text *before* the scheduled lectures to which they apply. Due to the nature of the material in this class, it is very difficult to adequately catch up right before exams.

Examination Policies

1. Three exams will be scheduled during the semester. Each exam will consist of objective items (true-false, multiple choice, matching etc.). The exams will not be cumulative. The third exam will be scheduled during our final exam time.
2. Students will **not** be allowed to leave the room during exams and quizzes. Please attend to any personal needs before the exam.
3. Quizzes are administrated at the beginning of class on assigned dates. If you are late you will not be granted additional time to complete the quiz. If you arrive after the quiz has been completed, you will not be allowed to complete the quiz (with the exceptions stated in #4 below).
4. Make-up exams and quizzes will be considered **only** for exceptional circumstances or university approved absence. (Note: "I overslept", "I'm tired", "I'm not prepared", etc. are **not** exceptional circumstances). Any student who fails to contact the instructor *prior* to any missed exam or quizzes might **not** be allowed to make-up the exam. It is your responsibility to contact the instructor in case of an emergency
5. Absence for medical reasons requires *written dated* verification by a physician.
6. Exams and quizzes will **not** be rescheduled based on a student's personal work/school schedule. Please plan ahead.
7. Questions/concerns regarding grading for any exam, quiz, or assignment must be resolved with the instructor within **one week** of the date graded exams are returned to the student.
8. All exams and quizzes are non-circulating.
9. Make-up exams and quizzes will differ from the corresponding test given to the rest of the class.
10. During exams and quizzes, hats must be removed or turned backwards and phones/pagers must be turned off and stored out of sight.
11. In the event that a student arrives late to an exam or quiz and one or more students have already completed the exam, the late student will not be allowed to take the exam and will receive a 0 for that exam.
12. Students must bring #2 pencils and a trigonometry calculator to each exam and quiz. **No cell phone, PDA etc. calculators will be allowed.** I will not have any for you to borrow and you may not share calculators with others in the class.

Exams:

Exams will cover the material specified in the course calendar unless otherwise delineated by the instructor. Although the exams are not designed to be cumulative biomechanics is cumulative by nature. Thus, you will be required to use some of the skills you learned in earlier sections during later exams.

Tests questions:

Prior to each test you must submit online (on the course Blackboard site) one question from each section/chapter assigned for that test. The questions must be multiple-choice with 5 viable answer options (no obvious wrong answers such as "who cares" etc.). You must highlight (bold) the correct answer (and make sure the answer is in fact correct or you will not receive any points). The questions are due at 11.59PM on the listed dates. I will then distribute all these questions to the class (via Blackboard) to use a preparation for the test. I will include 5-15 of the submitted questions on each test.

Out of Class assignment:
There will be 1 "out of class assignment" in which you will be required to summarize (1 page) and critically review (1 page) an original research paper from the biomechanics literature. All articles must be approved by the instructor in advance to ensure that they are appropriate for this assignment. www.pubmed.com is a good source for articles, but be careful in your selection as Pubmed also includes review articles. **Length of assignment: 2-page, 1 inch margins, double spaced, font 12. This assignment must be handed in online (Blackboard) with a pdf-copy of the paper you reviewed.** The University Writing Center is a good resource for help with the writing portion of this assignment; however, the work (ideas) must be yours. The Center is located in the Auditorium Building, Room 105. Call 565-2563 to make an appointment.

Grading:

Item:	**Maximal score:**
Test 1:	20 points
Test 2:	25 points
Test 3 (Final):	30 points
Quizzes: (3 points each for 5 best quizzes)	15 points
Test questions (2 point each for 3 tests)	6 points
Exam surveys (1 point each for first 2 tests)	2 points
Out of class assignment	2 points
Total	**100 points**

Final Grade (points)	
A	≥85
B	75-84
C	65-74
D	55-64
F	54 and below

All grading for this course will be criterion based (i.e. your grade will not depend on the score of other students). No additional or extra credit will be offered; please do not ask for any.

Other important information
Feedback & exam surveys: After the first 2 exams I will be asking you for feedback regarding this class. Please use this opportunity as it will help me to improve this class for you and future students. Please be as specific as possible in your comments. In addition, I encourage you to come by my office if you have questions, suggestions, or concerns regarding this class.

Classroom Behavior: Every student is expected to conduct themselves in a manner appropriate for an Institution of Higher Learning. Disruptive or degrading behavior will not be tolerated. See Code of Student Conduct for further details.

American with Disabilities Compliance: The Department of Kinesiology, Health Promotion, and Recreation does not discriminate on the basis of disability in the recruitment and admission of students, the recruitment and employment of faculty and staff, and the operation of any of its programs and activities, as specified by federal laws and regulations. The designated liaison for the department is Dr. Chwee Lye Chng, Physical Education Building, Room 209, 565-2651. Copies of the KHPR Department ADA Compliance policies are available in the Chair's Office, Physical Education Building, Room 209. Copies of the College of Education ADA Compliance Document are available in the Dean's Office, Mathews Hall 214. The student has the responsibility of informing the course instructor of any disabling conditions that will require modifications to avoid discrimination.

Academic Dishonesty: Cheating will not be tolerated in the class. You are not to receive information from another student or give information to another student during a test or quiz. You are to use only your memory. Students caught cheating during an examination or quiz will be charged under the University's Code of Student Conduct. Among other punishments, students found guilty run the risk of having their score changed to a zero, receiving a grade of F for the course, and/or dismissal from the University. Academic dishonesty includes cheating, plagiarism, fabrication, and facilitating academic dishonesty.
Cheating refers to collaborating on individual assignments and using unauthorized materials. Plagiarism refers to presenting ideas, words, or statements of another person without giving credit to that person. If you have questions about cheating or plagiarism, please see me.

Family Educational Rights and Privacy Act (FERPA) Information: Students have the right to expect their grades will be kept confidential. There are a few things, because of the size and/or nature of this class, the instructor must advise you of regarding collection and distribution of test results, quiz scores, homework assignments, roll sheets, projects, etc. During this class it may be necessary for you to pass your assignments forward to the instructor or it may be necessary for the instructor to call your name and then return your completed assignment to you by passing it across the room. The instructor, under the reasonable assumption guidelines, assumes students are collecting only their own materials. Every attempt will be made to keep your information confidential. Neither your course grades nor grades for any assignment will be posted in a way that could result in your being identified by other students or faculty members.

UNT E-mail and Blackboard. All students should activate and regularly check their UNT-E-mail account and the Blackboard site for this class. A lot of class information will be distributed ONLY via these outlets.

The instructor reserves the right to alter any portion of this syllabus.