QUANTITATIVE BIOMECHANICS **Department of Kinesiology** **CALIFORNIA STATE UNIVERSITY, NORTHRIDGE**

Spring 2007	KIN 445 **12230** K Dino Vrongistinos	Tu,,Th 08:00-09:20	Location: RE155

Instructor: Konstantinos "**Dino**" Vrongistinos, Ph.D.	**e-mail:** kv61497@csun.edu
Office: KN281	**Phone:** (818)-677-7567
Office Hours: M 13:30-15:30, T 17:30-18:30, TH 10:30-11:30 & by appointment	*http://www.csun.edu/~kv61497*

Required Text: *Basic Biomechanies* by S.J. Hall (4th ed.)

Course Prerequisites: KIN 345; Math 105 or 106 or equivalent

Course Description : Biomechanical analysis of human movement based on anatomical concepts and mechanical laws of motion.

Course Objectives: To provide students with the knowledge and skills to be able to:

(1) Apply mechanical laws and principles of applied physics to anatomical structures
(2) Describe how musculoskeletal structures influence human movement
(3) Apply kinematic & kinetic descriptors and measures to human movements
(4) Analyze the biomechanical correlates of specific skills and techniques
(5) Analyze selected injury and performance mechanisms
(6) Construct free body diagrams defining the operative mechanical factors in human movement situations.
(7) Utilize vector algebra, the equations of uniform acceleration, and the principles of static and dynamic equilibrium to solve problems relating to human movement.
(8) Analyze the influences of selected kinetic quantities on human motion, including friction, impulse and momentum, mechanical work, power, energy, torque, moment of inertia, and center of gravity location.
(9) Apply biomechanical principles to the daily activities of normal and special populations, including individuals with disabilities, throughout the lifespan.
(10) Write a paper reviewing current biomechanics literature on a selected topic.
(11) Make a presentation to the class on a topic of current interest in biomechanics.
(12) Learn to program with a matrix scripting language like Matlab.

Evaluation: Course grades will be based on the following point distribution

Assignment	Points	Percent
Problem Sets and Quizzes	200 pts	20%
Midterm Exam	300 pts	30%
Term Paper	100 pts	10%
Presentation	100 pts	10%
Final Exam	300 pts	30%
Total	1000 pts	100%

Assignment of grades will be based on the following ranges:

A = 900-1000 pts;	B = 800-899 pts;	C = 700-799 pts;	D = 600-699 pts;	F = less than 600 pts.

Assignment of plus/minus grade adjustments to the above scale will be determined by the final class point distribution.

Examination Policies & Miscellaneous Information

1. Students will **not** be allowed to leave the room during exams. Please attend to any personal needs before the exam.
2. Make-up exams will be considered only under exceptional circumstances.
   (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 may **not** be allowed to makeup the exam.
3. Absence for medical reasons requires written verification by a physician.
4. Exams will **not** be rescheduled based on a student's personal work/school schedule. Please plan ahead.
5. Questions/concerns regarding grading for any exam must be resolved with the instructor within **one week** of the date graded exams are returned to the student.
6. All exams are non-circulating.

Each student is expected to be familiar with, and abide by, the conditions of student conduct, as presented in the CSUN Catalog (Appendix C), with emphasis on sections: Student Conduct Code, Academic Dishonesty, Faculty Policy on Academic Dishonesty, and Penalties. Any student engaging in academic dishonesty (e.g., cheating, fabrication, facilitating academic dishonesty, plagiarism) is subject to discipline, which may include a failing grade in the course, and may also be subject to more severe discipline by the University.

A. *Time Elements* Class begins promptly on the hour

B. *Behavior* Treat other students and the instructor with respect and civility. Free discussion, inquiry, and expression is encouraged in this class. Classroom behavior that interferes with either (a) the instructor's ability to conduct the class or (b) the ability of students to benefit from the instruction is not acceptable. Examples may include routinely entering class late or departing early; use of beepers, cellular phones, or other electronic devices; repeatedly talking in class without being recognized; talking while others are speaking; or arguing in a way that is perceived as "crossing the civility line." Eating food or chewing ice during lecture or discussion time is unacceptable.

C. *Cheating* will not be tolerated. Severe penalties will be imposed including an F on the exam, and potentially and F in the course, and may also be subject to more severe discipline by the University. Please review the Student Conduct on Academic Dishonesty in the current Schedule of Classes and in the University Catalog.

D. *Assignments* turned in one day late will receive 50% credit. After one day, no credit will be given.

Reading Assignments **Please Note**:

The reading assignments listed below 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. Students are expected to have read the assigned sections in the text* before *the scheduled lectures to which they apply. (Reading assignment schedule subject to change with appropriate notice).

	T	**Th**		Reading Materials	
Jan	30	1	Ch. 1	Terminology	Week 1
Feb	6	8	Ch. 2	Planes, Instrumentation	Week 2
	13	15	Ch 10,11	Linear & Angular Kinematics	Week 3
	20	22	Ch. 3,10	Basic Concepts, Projectile Motion	Week 4
	27	29	Ch. 12,14	Linear & Angular Kinetics	Week 5 **HW1 Due**
March	6	8	Ch.12:	Friction, Impact, Work	Week 6
	13	15	Ch.13	Torque	Week 7
	20	22	Ch.13:	Center of Gravity *Review Drafts Due*	Week 8 **HW2 Due**
	27	29		*Test Tuesday 27th* *Review* ***Drafts Due*** *Initial Presentations 29th*	Week 9 **Midterm**
April	3	5	*Spring Recess*		*No class*
	10	12	Ch.13, 14	Dynamic Equilibrium	Week 10
	17	19	Ch.14	Angular Momentum	Week 11
	24	26	Ch.15	Fluid Mechanics	Week 12 **HW3 Due**
May	1	3	Student Presentations		Week 13
	8	10	Student Presentations		Week 14 **Exam #3**
	15	*17*	Student Presentations		Week 15
May 21-25 Finals	22		**T May 22 08:00-10:00**	**Tuesday May 22 RE155 08:00-10:00**	Final Week 16

Schedule is tentative and subject to changes

Note: **Students with exceptional needs**: This instructor, in conjunction with California State University Northridge, is committed to upholding and maintaining all aspects of the federal Americans with Disabilities Act (ADA) of 1990 and Section 504 of the Rehabilitation Act of 1973. If you are a student with a disability and wish to request accommodations, please contact the **Center on Disabilities** located in Student Services Building BH 110, or call (818) 677-2684 for an appointment. http://www.csun.edu/cod/ , codss@csun.edu, Phone: (818) 677-2684, Fax: (818) 677-4929, Office Hours: M - F 8:00-16:45 Any information regarding your disability will remain confidential. Because many accommodations require early planning, requests for accommodation should be made as early as possible. Any requests for accommodations will be reviewed in a timely manner to determine their appropriateness for this class.

Links

www.csun.edu/~kv61497, webteach.csun.edu, kinesiology.csun.edu
www.csun.edu/webmail , www.csun.edu/portal , www.csun.edu/account

Attention: Last day to drop is Friday of the 2nd week of classes

Graduate Students taking KIN445 for graduate credit will need to collect field data as a part of their term-paper and presentation project.