

KIN 412/512 Biomechanics of the Skeletal System  
Course Syllabus, Fall 2005

I. **INSTRUCTOR:** Dr. Rick Hinrichs (PEBE 206, 965-1624, email: hinrichs@asu.edu)

Office hours:

<b>M</b> 2:00 - 3:00 PM, <b>T</b> 12:00-1:00 PM, <b>Th</b> 9:30 - 10:30 AM, or by appointment. Please sign up in advance on my office door to reserve a meeting time.
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<b>Class web page:</b> <a href="http://www.public.asu.edu/~hinrichs/classes/kin412-512">www.public.asu.edu/~hinrichs/classes/kin412-512</a>
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## II. COURSE DESCRIPTION

The purpose of this course is for the student to develop an awareness of the mechanical principles that determine the functioning of the musculoskeletal system. The course begins by presenting the mechanical properties of the various biological materials (e.g. bones, ligaments, tendons, cartilage, and muscles). This is followed by analyses of the mechanics of the major joints of the body. Emphasis is given to the mechanical causes of injury.

## III. COURSE REQUIREMENTS AND WEIGHTING SCHEME

	<u><b>412</b></u>	<u><b>512</b></u>
1. Exam 1 (approximately week 6, after topic 4)	24%	22%
2. Exam 2 (approximately week 11, after topic 7)	24%	22%
3. Final exam (comprehensive)		
Friday, Dec. 9, 10:00-11:50 AM	36%	34%
4. "Other" (miscellaneous written assignments)	16%	22%

The written assignments may include some or all of the following: quizzes, lab reports, critiques of articles, problem sets, and a 5-10 page term paper on a topic of the student's choice. The topic must be approved by the instructor. Note: Students taking this course for graduate credit (512) will be expected to write longer critiques and lab reports, and a longer term paper (15-20 pp. rather than 5-10 pp.). Each written assignment will have a specific due date. A 5% deduction will be made for each 24 hours (beginning at the start of class on the due date) that an assignment is turned in late. Monday is considered one day later than Friday for the purposes of deductions for late papers.

## IV. COURSE EVALUATION

The above weighting scheme will be used to compute an overall average score for each student. All grades will be curved. The approximate cutoff scores for KIN 412 from previous semesters are as follows\*:

A+: 92%, A: 88%, A-: 85%, B+: 82%, B: 79%, B-: 75%, C+: 71%, C: 63%, D: 55%

*Note: 512 grade cutoffs are about 2% higher than those for 412.
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## V. REQUIRED TEXTBOOKS (available at bookstores)

Nordin, M. and Frankel, V.B. (2001). *Basic Biomechanics of the Musculoskeletal System* (3<sup>rd</sup> ed.), Lippicott Williams and Wilkins, Philadelphia.

Wiktorin, C. von H. and Nordin, M. (1986). *Introduction to Problem Solving in Biomechanics*. Lea and Febiger, Philadelphia.

## VI. SUPPLEMENTAL READINGS AND ASSIGNMENTS (via class web page)

Supplemental readings will be assigned and will be made available for downloading as .pdf files from the class web page. Check the class web page regularly for updates:

(<http://www.public.asu.edu/~hinrichs/classes/kin412-512/>)

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## Biomechanics of the Skeletal System

### Course Outline

<u>Topic</u>	<u>N &amp; F</u>	<u>Readings*</u>	<u>W &amp; N</u>
1. Introduction/Math Review/Problem Solving	Ch 1, App. 1		Ch 1, 2, 3, App. B
2. Biomechanics of Bone	Ch 2		
3. Biomechanics of Articular Cartilage	Ch 3		
4. Biomechanics of Tendons and Ligaments	Ch 4		
5. Biomechanics of Skeletal Muscle	Ch 6		
6. Biomechanics of the Knee	Ch 6, 17, 18		Ch 8
7. Biomechanics of the Hip	Ch 7, 17, 18		Ch 7
8. Biomechanics of the Ankle and Foot	Ch 8, 9, 17, 18		Ch 4
9. Biomechanics of the Spine	Ch 10, 11, 17, 18		Ch 9,10
10. Biomechanics of the Shoulder	Ch 12		Ch 6
11. Biomechanics of the Elbow*	Ch 13		Ch 5
12. Biomechanics of the Wrist/Hand*	Ch 14, 15		

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\* Readings from the textbooks:

N & F = Nordin & Frankel (2001), W & N = Wiktorin & Nordin (1986)

\* Time permitting