

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

**Kinesiology 476**  
**MUSCULOSKELETAL BIOMECHANICS AND INJURY**  
**Spring 2008**

Instructor: William C. Whiting, Ph.D. (Office: RE 256)  
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Office Hours: Thursday, 10:00-11:00 a.m. and by appointment

Class Schedule: Tuesday and Thursday, 12:30 -1:45 p.m. Room: RE 104

Required Text: Whiting, W.C., & Zernicke, R.F. *Biomechanics of Musculoskeletal Injury*, Human Kinetics, 1998.

Course Prerequisites: KIN 345 and completion of lower division writing requirement

Course Description: Biomechanical analysis of bone, joint cartilage, and collagenous tissues, and of forces and moments acting at the major joints of the human body.

Departmental Learning Outcomes: The Department of Kinesiology has six Student Learning Outcomes (SLO).

1. Demonstrate an understanding of the multi-disciplinary and integrated nature of kinesiology.
2. Apply, integrate and communicate kinesiological principles and movement-related knowledge across diverse settings and populations to enhance quality of life and encourage adoption of healthy lifestyles.
3. Apply innovative technology to understand and enhance human movement.
4. Demonstrate commitment to professional growth.
5. Demonstrate reasoning, problem solving, critical thinking, and reflective strategies in the pursuit and application of movement related knowledge.
6. Develop and apply assessment tools to measure and evaluate movement program efficacy.

SLOs are aligned with the following Course Objectives as indicated in brackets [SLO #].

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

- (1) Describe the anatomical structure and mechanical properties of bone, cartilage, and collagenous tissues.
- (2) Identify the anatomical structures comprising the major joints in the human body and explain how these structures influence motion capabilities [SLO 2].
- (3) Describe the different types of mechanical loads and explain their respective effects upon biological tissues [SLO 2, 5].
- (4) Utilize knowledge of the conditions of static equilibrium to perform static force and torque analyses of load-bearing anatomical structures [SLO 2].
- (5) Identify and discuss the general research approaches currently being used to investigate problems in the area of skeletal and collagenous tissue mechanics [SLO 2, 5].
- (6) Assess the mechanical loading of musculoskeletal tissues and the factors involved in determining and describing injury mechanisms [SLO 2].
- (7) Apply the principles of mechanics to musculoskeletal tissue response in various groups, including individuals with disabilities and age-specific populations [SLO 1, 2, 5].
- (8) Write a paper reviewing current biomechanics literature on a selected topic [SLO 1, 2, 5].
- (9) Make a class presentation on a topic of current interest in biomechanics [SLO 3, 5].

Evaluation: Class grades will be based on the following point distribution.

Exams	600 pts	(60%)
Term Paper	300 pts	(30%)
Class Presentation	100 pts	(10%)
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Course 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. Questions/concerns regarding grading for any exam must be resolved with the instructor within **one (1) week** of the date graded exams are returned to the student. All exams are non-circulating. Make-up exams will be considered only under exceptional circumstances. Any student who fails to contact the instructor *prior* to any missed exam may **not** be allowed to makeup the exam. Absence for medical reasons will require *written* verification by a physician. Exams will **not** be rescheduled based on a student's personal work/school schedule. Exam dates are set in advance. Please plan ahead. Problem sets and any writing assignments are due *at the beginning of class* on the due date. Late assignments will be penalized.

**Students with Disabilities:** 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 office of Students with Disabilities Resources located in SB 110, or call (818) 677-2684 for an appointment. 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.

**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.**

**Reading Assignments** - 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.

***Biomechanics of Musculoskeletal Injury***  
(Whiting & Zernicke)

Week 1:	Ch. 1: pp 1-13
Week 2:	Ch. 2: pp 15-40
Weeks 3-4:	Ch. 3: pp 41-85
	Exam #1 (Tuesday – February 19)
Weeks 5-6:	Ch. 4: pp 87-111
Weeks 6-9:	Ch. 5: pp 113-135
	Exam #2 (Thursday - Mar 27)
Week 10:	Ch. 6: pp 137-175
Week 11:	Ch. 7: pp 177-204
Week 12:	Ch. 8: pp 205-244
Week 13:	No assigned readings
	Exam #3 (Thursday – April 24)
Weeks 14-15	Individual readings associated with term paper and presentation

Additional readings may be assigned as the course progresses.

## LECTURE SCHEDULE

Week 1	Tue	Jan 22	Introduction
	Thu	Jan 24	Overview of Musculoskeletal Injury
Week 2	Tue	Jan 29	Biological Tissues
	Thu	Jan 31	Biological Tissues
Week 3	Tue	Feb 5	Biomechanical Concepts
	Thu	Feb 7	Biomechanical Concepts
Week 4	Tue	Feb 12	Biomechanical Concepts
	Thu	Feb 14	Biomechanical Concepts
Week 5	Tue	Feb 19	<b>EXAM #1</b>
	Thu	Feb 21	Tissue Mechanics
Week 6	Tue	Feb 26	Tissue Mechanics
	Thu	Feb 28	Tissue Mechanics and Adaptation
Week 7	Tue	Mar 4	Tissue Mechanics and Adaptation
	Thu	Mar 6	Introduction to Musculoskeletal Injury
Week 8	Tue	Mar 11	Mechanisms of Injury
	Thu	Mar 13	Mechanisms of Injury
March 17-21	<b>Spring Recess</b>		<b>No Class Meetings</b>
Week 9	Tue	Mar 25	Mechanisms of Injury
	Thu	Mar 27	<b>EXAM #2</b>
Week 10	Tue	Apr 1	Lower Extremity Injuries
	Thu	Apr 3	Lower Extremity Injuries
Week 11	Tue	Apr 8	Upper Extremity Injuries
	Thu	Apr 10	Upper Extremity Injuries
Week 12	Tue	Apr 15	Head, Neck & Trunk Injuries
	Thu	Apr 17	Head, Neck & Trunk Injuries
Week 13	Tue	Apr 22	Integrative Injury Mechanics
	Thu	Apr 24	<b>EXAM #3</b>
Week 14	Tue	Apr 29	Student Presentations
	Thu	May 1	Student Presentations
Week 15	Tue	May 6	Student Presentations
	Thu	May 8	Student Presentations

(Schedule subject to change, with appropriate notice, as opportunities and circumstances may dictate)