

CALIFORNIA STATE UNIVERSITY, NORTHRIDGE
Department of Kinesiology

Kinesiology 345
BIOMECHANICS

SYLLABUS

Instructor: William C. Whiting, Ph.D.
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Office hour: Wednesday, 9:00-10:00 am and by appointment

Class Schedule: Wednesdays, 10:00 am – 12:40 pm Room: RE 155

Required Texts: 345: *Basic Biomechanics* by S.J. Hall (5th ed.), McGraw Hill, 2007.
345L: *Biomechanics Lab Manual* (purchase at QuickCopies in Bookstore)

Course Prerequisites: KIN 211/212 or KIN 275, and KIN 300; passing score on ELM.

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

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) Apply mechanical laws and principles of applied physics to anatomical structures [SLO #2, 5].
- (2) Describe how musculoskeletal structures influence human movement [SLO #2].
- (3) Apply kinematic & kinetic descriptors and measures to human movements [SLO #2, 5].
- (4) Analyze the biomechanical correlates of specific skills and techniques [SLO #2, 5].
- (5) Analyze selected injury and performance mechanisms [SLO #2, 5].
- (6) Assess movement patterns characteristic of special populations, including individuals with disabilities, throughout the lifespan [SLO #2, 3].

(continued)

Evaluation: Course grade will be based on the following point distribution.

Exam #1	250 pts (25%)	Assignment of grades will be based on the ranges:	A = 900-1000 pts
Exam #2	250 pts (25%)		B = 800-899 pts
Exam #3	200 pts (20%)		C = 700-799 pts
Final Exam	300 pts (30%)		D = 600-699 pts
			F = < 600 pts
----- Course Total	----- 1000 pts (100%)		[plus/minus grade adjustments will be determined by final class distribution]

Examination Policies

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.

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. Students are expected to have read the assigned sections in the text *before* the scheduled lectures to which they apply.

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.

KIN 345 – Biomechanics – Lecture Schedule

<u>Week</u>	<u>Day</u>	<u>Date</u>	<u>Lecture Topic</u>
1	Wed	Jan 23	Introduction and Anatomy Review
2	Wed	Jan 30	Functional Anatomy Musculoskeletal Mechanics
3	Wed	Feb 6	Arthrology and Joint Function
4	Wed	Feb 13	Skeletal Muscle Mechanics
5	Wed	Feb 20	EXAM #1 Introduction to Kinematics
6	Wed	Feb 27	Kinematics and Projectile Motion Introduction to Kinetics
7	Wed	Mar 5	Forces and Lever Systems
8	Wed	Mar 12	Torque
[March 17-21 – Spring Break – No class meetings]			
9	Wed	Mar 26	Newton's Laws of Motion Center of Gravity and Stability
10	Wed	Apr 2	EXAM #2 Moment of Inertia
11	Wed	Apr 9	Momentum and Impulse Work, Power, and Energy
12	Wed	Apr 16	Friction Ergonomics and Applied Biomechanics
13	Wed	Apr 23	EXAM #3
14	Wed	Apr 30	Fluid Mechanics
15	Wed	May 7	Biomechanics of Injury

FINAL EXAM - May 14 (Wednesday) 10:15 am – 12:15 pm

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

Reading Assignments

Basic Biomechanics by Susan J. Hall (5th edition)

Weeks 1-2: Ch. 1: 2-19, 29-53
Ch. 4: 88-102
Ch. 7: 188-199, 204-209, 212-219
Ch. 8: 232-238, 240-246, 253-259
Ch. 9: 278-296

Week 3: Ch. 5: 120-136

Week 4: Ch. 6: 150-175

----- **Exam #1 (Wednesday – Feb 20)** -----

Week 5: Ch. 1: 2-19
Ch. 10: 322-333
Ch. 11: 360-380

Week 6: Ch. 10: 333-344
Ch. 3: 62-76

Week 7: Ch. 13: 430-437

Week 8: Ch. 13: 424-430

Week 9: Ch. 12: 388-392
Ch. 13: 440-449
Ch. 14: 474-476

----- **Exam #2 (Wednesday – Apr 2)** -----

Week 10: Ch. 14: 460-464

Week 11: Ch. 12: 398-403, 407-414
Ch. 14: 464-474

Week 12: Ch. 12: 393-398

----- **Exam #3 (Wednesday – April 23)** -----

Week 13: no readings

Week 14: Ch. 15: 486-505

Week 15: Ch. 4: 102-105
Ch. 5: 136-137
Ch. 6: 175-176
Ch. 7: 202-204, 211-212, 219-220
Ch. 8: 240, 249-253, 261-264
Ch. 9: 302-307