



**University of Oregon**  
**Department of Exercise and Movement Science**  
**Course Syllabus**

**EMS 410/510**  
**Orthopedic Biomechanics**  
**Spring 2004**

**Meets:** 154 Straub, MW 12:00 - 13:50 pm

**Instructor:** Dr. Li-Shan Chou

**Office:** 340 Gerlinger

**Office Hours:** Tu and Th 10 – 11:30 am

**Phone:** 6-3391

**E-Mail:** [chou@uoregon.edu](mailto:chou@uoregon.edu)

**Texts:** Nordin & Frankel, Basic Biomechanics of the Musculoskeletal System  
Mow & Hayes, Basic Orthopaedic Biomechanics

\*\*\* Journal articles will also be assigned throughout the course.

**Course Description:**

This course will build on the principles of musculoskeletal biomechanics to facilitate an understanding of key concepts in orthopedics. This understanding should prove beneficial to those pursuing careers in the medical fields, specifically the orthopedic and physical medicine specialties.

**Course Objectives:**

Upon completion of this course, each student should be able to:

- Understand and quantify the forces and moments of the musculoskeletal system.
- Understand and quantify the mechanical/material behavior of the skeletal system.
- Understand musculoskeletal dynamics, locomotion, and clinical applications.
- Understand the necessary factors in artificial joint implant success and be able to discuss the efficacy of implant systems.

**Grading Criteria**

Class Participation/ Homework	20%
Group Presentation	20%
Mid-Term Exam	30%
Final Exam	30%

**Course grade will be on the following scale:**

A	90 - 100%
B	80 – 89%
C	70 - 80%
D	60 - 69%
F	<60%

\*\*Make-up tests will only be allowed if pre-approved by instructor.

**Course Schedule:**

<b>Week</b>	<b>Date</b>	<b>Topic</b>
1	March 29 - April 2	Review Biomechanics Kinematics/Kinetics Free-body diagrams
2	April 5 - 9	<i>In Vivo</i> vs. <i>In Vitro</i> : 1). Measurement 2). Techniques (Visit Motion Analysis lab- Gerlinger Annex B52)
3	April 12 - 16	Analysis of Muscle and Joint Loads Joint Reaction Forces Bone-to-Bone Contact Forces/Muscle Forces <b>Journal Club #1</b>
4	April 19 - 23	Introduction to Musculoskeletal Dynamics/Direct vs. Inverse Dynamics <b>April 21. No Class (GCMAS meeting)</b>
5	April 26 - 30	Clinical Applications of Musculoskeletal Dynamics <b>Journal Club #2</b>
6	May 3 - 7	Material Science Introduction <b>Mid-Term Exam: May 5<sup>th</sup> (Wednesday)</b>
7	May 10 - 14	Mat. Sci. Applications: Bone Mat. Sci. Applications: Soft Tissues
8	May 17 - 21	<b>Journal Club #3</b> Implant Systems Introduction
9	May 24 - 28	<b>May 24: No Class</b> Implant Systems: Mechanical/material considerations
10	May 31 – June 4	<b>Journal Club #4</b> Implant Systems: Bone Interface & Biological considerations
	June 9	<b>Final Exam</b> <b>June 9th, Wed. 10:15 am</b>

\*\* Note that any necessary adjustments to this schedule will be announced in class.