

Course Syllabus

HPHY 486/586 Orthopedic Biomechanics

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

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Texts: Nordin & Frankel, Basic Biomechanics of the Musculoskeletal System
Mow & Hayes, Basic Orthopaedic Biomechanics *** Journal
articles will also be assigned throughout the course.

Prerequisites: HPHY 381 (undergraduate biomechanics) or equivalent, Fundamental Physics & Linear Algebra

Blackboard Site: The majority of information for this course will be conveyed to you via the course blackboard site. Consequently, you should be sure to consult it every day or so. In addition to this syllabus, such things as important announcements, quizzes, lecture handouts, and other materials will be available on the blackboard site.

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.

Attendance at Lectures:

Consistent attendance reflects professional behavior and it is expected students attend class on a regular basis. In the event of an emergency or illness, students should notify the course instructor. Students will be responsible for all information, course content, and schedule changes presented during lectures.

Literature Review and Journal Club:

A research topic with a journal article will be selected for classroom discussion biweekly. Individual's participation to classroom discussion is required. You are expected to discuss the overall purpose or testing hypotheses, strength, and weakness of the selected journal article. **In addition, each of the graduate students will be assigned for conducting a literature review and making a brief presentation on the selected topic.**

Grading Criteria

Homework	20%
Class Discussion/Paper	
Presentation	20%
Mid-Term Exam	30%
Final Exam	30%

Course grade will be on the following scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	<60%

Course Schedule:

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

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

