



University of Oregon
Department of Human Physiology

Course Syllabus

HPHY 682
Biomechanics
Winter 2005

Meets: 248 PLC; UH 12:00 – 13:20

Instructor: Dr. Li-Shan Chou

Office: 340 Gerlinger Hall

Office Hours: Tuesday and Thursday 9:30-11:00 AM or by appointment

Phone: 346-3391

E-Mail: chou@uoregon.edu

Text: D. Gordon E. Robertson et al., Research Methods in Biomechanics.
Human Kinetics, 2004.

Prerequisites: EMS 681 or equivalent, Basic Physics & Linear Algebra

Website URL: <http://blackboard.uoregon.edu>

Course Description: This course is the second of a three-course sequence in graduate Biomechanics that also includes EMS 681 and EMS 683. This course will continue our discussion on kinetic analysis of human movement and will focus on quantitative analysis of human gait. Both theoretical and applied aspects of kinetic gait analysis will be addressed throughout this course.

Course Objectives: By the completion of this course, students should:

1. Be aware of literature sources related to the field of human motion analysis.

2. Understand fundamental theoretical concepts of three-dimensional kinematic and kinetic analysis of human motion.
3. Be able to independently conduct a kinetics-related research project from the planning stage to the presentation of research findings.

Course Readings: In addition to the assigned textbook and course pack, you are responsible for the assigned readings from the class.

Attendance at Lectures: You are not absolutely required to attend the lectures, however, you will be responsible for all information, lecture content, and schedule changes presented during lectures.

Term Proposal: A final written research proposal will be due on March 4 (Tuesday of the 9th week).

- A research project (related to human movement) of your interest.
- The proposal is limited to 20 pages (double space/12pt) and have to include the following sections:

Background/Significance

Why is this research problem important?

What has been reported in the literature?

What information is needed to enhance our knowledge about this research topic?

Specific Aims / Hypotheses

Itemize your specific goals in this proposed study.

What do you expect in your results?

Methodology/Data Analysis

How will you perform this study?

Description of the subject inclusion criteria, experimental protocol, equipments, etc...

Plan for data analysis; variables to be examined, etc...

References

Grading Criteria: There will be one midterm exam and a comprehensive final exam. The exams, assignments, and term proposal/presentation will contribute to your final grade in the following manner.

Assignments	20%
Midterm	30%
Term Proposal	20%
Final (comprehensive)	30%

Final Grades: The following grading system will be used based on the combined scores in each of the assessments above.

A	90 -100%	B	80 - 89%
C	65-79%	D	< 64%

HPHY 682 Biomechanics (Winter 2005)
Course Outline

Week 1: January 3-7

- Course Overview
- Body Segment Parameters (Chapter 3)

Week 2: January 10-14

- Body Segment Parameters
- Review of Linear and Angular Kinetics (Chapter 4)

Week 3: January 17-21

- Force Plate Measurements (Chapter 4)
- Ground Reaction Forces/AMTI Force Plates

Week 4: January 24-28

- Computation of Center of Pressure
- Example Practice

Week 5: January 31 - February 4

- Inverse Dynamics Solutions
- Newton-Euler Formulations

Week 6: February 7-11

- **Midterm Exam (2/8/2005)**
- Computation of Joint Forces, Moments
- Inter-External Joint Moments

Week 7: February 14-18

- Mechanical Work, Energy, and Power
- Internal / External Work
- Positive / Negative Work of Muscles
- Efficiency

Week 8: February 21-25

- Joint Kinetics during Walking
- Variability in Joint Moment Patterns
- Errors in Joint Kinetics

Week 9: February 28 - March 4

- Muscle Mechanics
- Muscle Force Determination
- Bone-to-Bone Contact Forces

Week 10: March 7-11

- **Term paper oral presentations**

FINAL EXAM

**Friday, March 18 2005
8:00 – 10:00 am**

Note: This schedule may be modified.