UNIVERSITY OF MASSACHUSETTS
DEPARTMENT OF EXERCISE SCIENCE

EXERCISE SCIENCE 732 - Advanced Biomechanics

Spring, 2004

INSTRUCTOR : Joseph Hamill, Ph.D.
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OFFICE HOURS : 9:00-10:00 Monday, Wednesday or by appointment.
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COURSE PREREQUISITES

Exercise Science 531 or permission of instructor.

OBJECTIVES

This course is designed to fulfill the following objectives:

1) To provide an introduction to the quantitative techniques used in biomechanics.
2) To provide the student with the background to allow him/her to be competent and informed in the use of most of the major types of laboratory equipment. These include:
   • High-speed videography (both 2-D and 3-D)
   • Force platforms
   • Accelerometry
   • Pressure-recording devices
3) To provide the student with the background in basic numerical methods (i.e. data smoothing, Fourier Transforms, etc.).
4) To provide an introduction to microcomputers as a data acquisition and analysis device.
5) To provide an introduction to some of the key literature.

COURSE REQUIREMENTS

1. Mid term examinations 50 points
2. Final examination 50 points
3. Assignments 200 points
   Total 300 points

All assignments must be turned in on the designated due date or they will not be accepted. No excuses will be accepted.
**GRADING**

The grading for this course will follow the University of Massachusetts standard. That is:

- A+  >94
- A   90> <93
- A-  86> <89
- B+  80> <85
- B    75> <79
- B-  70> <74
- F    less that 69

**SUGGESTED READING**

There is no specific textbook for this class. However, the following books are suggested as complimentary readings for the class:


**COURSE CONTENT**

Classroom lectures on the following topics will be held periodically throughout the semester. After the lectures, students will undertake their projects. Individual meetings and data collection sessions may take place during scheduled class meetings. This protocol will be repeated for each instrumentation set-up with varying amounts of class time interspersed between data collection sessions.

1. Introduction

2. High-speed videography - 2-D and 3-D

3. Force platform

4. Joint moments - 2-D and 3-D

5. Accelerometry and electrogoniometry

6. Plantar pressure measurement