SPORTS BIOMECHANICS
運動生物力學

Fall, 2011

Instructors: Lin-Hwa Wang 王岑華
Tel: 06-2757575 ext. 31631, wangleh@mail.ncku.edu.tw

Lecture Hours: Thursday 09:10-12:00

Course Objective
The course will give an overview of the current problems in sports biomechanics. A field trip to the motion analysis lab in addition to student presentations will enhance both the overview lectures and speaker presentations.

Texts
1. Lecture Notes
2. Biomechanical Basis of Human Movement by J. Hamill, K.M. Knutzen, Lippincott Williams & Wilkins, 2003, pp. 3-29.

Prerequisites
It will be assumed that all students have a background in statistic and computer programming.

Grading
30% Homework
30% Midterm Exam
40% Term Paper

Examinations
There will be one midterm examination covering the material indicated in the course syllabus. All examinations will be closed book.
Written Term Project and Presentation
All students are required to complete a written project on a topic of their choice from the area of sports biomechanics. All topics must be approved by the instructors on or before November 3, 2011. The project should include a review of the literature of the subject and a quantitative analysis of the material. While there is no length requirement for the written paper, it should provide a complete discussion of the subject. On December 1, the discussion of each student’s project will be held. The final draft of the project is due by the end of class on Thursday, January 12, 2012. Students are encouraged to submit a draft of the written paper to the instructors for comment. These draft copies must be submitted no later than January 26. In-class presentations of the project material will take place on January 5 & 12. The order of the presentations will be assigned randomly. The duration of the oral presentations will be determined once the final size of the class is known. Students may use overheads or a computer-based Powerpoint presentation in support of their oral remarks. Those using Powerpoint must provide the file to the instructors on a CD-ROM disk no later than 15 minutes before the start of the class in which they will be making their presentation.

Syllabus

Topics
- Introduction
- Review
- Biomechanical Basis of Human Movement
- Basic Biomechanics of the Musculoskeletal System
- Kinematics Geometry of Human Motion
- Kinetics of Human Locomotion
- Mechanical Work, Energy, and Power
- Ground Reaction Force
- Human Balance and Posture Control
- Motion Analysis

Term Paper

Assignment
Survey the literature on a specific topic in the field of sports biomechanics. Describe the current state-of-the-art and suggest areas that require further research. Then briefly describe how you might try to investigate the problem yourself.
Topic

Some possible areas from which a specific topic might be chosen include: muscle models, joint models, human movement measurement techniques, gait analysis, electromyography, neural control of movement, methods of estimating joint moments, and strength training.

Note: nearly all of these areas are too broad. A specific topic from these fields must be chosen.

The manuscript should be technically well written and organized. It should be well referenced using primary journal articles (i.e., not text books). The following source may be useful:

*American Journal of Sports Medicine*
*Human Movement*
*Journal of Biomechanics*
*Clinical Biomechanics*
*Journal of Electromyography & Kinesiology*
*Journal of Applied Biomechanics*
*Journal of Science and Medicine in Sport*
*Journal of Sports Sciences*
*Medicine & Science in Sports & Exercise*

Other journal which may be of secondary assistance:

*Clinical Orthopaedics and Related Research*
*Journal of Applied Physiology*
*Journal of Orthopaedic Research*
*Journal of Motor Behavior*
*Clinics in Sports Medicine*
*Clinical Journal of Sport Medicine*