HLHP 7670 – Laboratory Techniques in Biomechanics (3 credits)

Spring 2013

Instructor: Wendi Weimar, PhD
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Meetings:

Lecture: TR 11-12:15 PM
MC 1081 & Sport Biomechanics Lab

Text: None

Course Description: Learning techniques and methods used in biomechanical analysis of human movement, and applications of these techniques and methods in data collection, and analysis for research and teaching in biomechanics.

Course Objectives: The students will be able to:

1. employ imaging techniques to record and analyze human movement;
2. conduct anthropometric measurement in human movement;
3. operate force platform and force measuring systems for human motion analysis;
4. administer electromyography for human motion analysis.

Course Contents:

Week 1. Introduction to Biomechanical testing procedure – prepared by instructor
Template for completing a laboratory report
Data tools
Week 2. Motion Capture – old school
Camera operation and facts
Lab 1 – acceleration due to gravity
Week 3. Motion capture: video cameras - prepared by instructor
Lab 2: Linear data extraction and interpretation from video camera data-APAS
Week 4. Motion capture: Imaging data treatment and analysis: filter & normalization - prepared by instructor
Lab 3: Angular data extraction and interpretation from video camera data-APAS
Week 5. Motion capture: optical sensor system and flock of birds– prepared by instructor
Lab 4: Smooth and normalize previous data

Week 6. Force measurement: force platform and strain gauge – prepared by instructor
Lab 6: Operation of force platform-static
Week 7. Force measurement: force platform – prepared by instructor
Lab 7: Force platform - dynamic
Week 8. Balance measurement – prepared by instructor
Lab 8: Field measures vs computer postugraphy
Week 9: Muscle activation patterns: EMG – prepared by instructor
Lab 9: Application of EMG
Week 10. Anthropometric measurement- prepared by instructor
Lab 10: Measurement of body segments
Week 11. Anthropometric measurement: Center of gravity - prepared by instructor
Week 12. Data collection week for project
Week 13. Dynamic model: Two segments with EMG & Force platform- prepared by instructor
Lab 14: Integration of Motion capture, EMG & Force platform data
Week 14. Project presentations
Week 15. Lab practical

Course Requirements:

Laboratory work, project, midterm and final exam will be given during this course.

8. Grading and Evaluation Procedure:

Lab work	..... 30%	90 - 100 --- A
Project	..... 20%	80 - 89 --- B
Mid Exam	..... 20%	70 - 79 --- C
Final Exam	..... 30%	60 - 69 --- D
		Under 60 --- F

Class Policy Statements:

Excused Absences: Students are granted excused absences from class for the following reasons: Illness of the student or serious illness of a member of the student's immediate family, the death of a member of the student's immediate family, trips for student organizations sponsored by an academic unit, trips for University classes, trips for participation in intercollegiate athletic events, subpoena for a court appearance, and religious holidays. Students who wish to have an excused absence from this class for any other reason must contact the instructor in advance of the absence to request permission. The instructor will weigh the merits of the request and render a decision.

When feasible, the student must notify the instructor prior to the occurrence of any excused absences, but in no case shall such notification occur more than one week after the absence. Appropriate documentation for all excused absences is required. Please see the *Tiger Cub* for more information on excused absences.

Make-Up Policy: Arrangement to make up missed major examination (e.g. hour exams, midterm exams) due to properly authorized excused absences must be initiated by the student within one week from the end of the period of the excused absences. Except in unusual circumstances, such as continued absence of the student or the advent of university holidays, a make-up exam will take place within two weeks from the time that the student initiates arrangements for it. Except in extraordinary circumstances, no make-up exams will be arranged during the last three days before the final exam period begins. The format of the make-up exam will be specified by the instructor depending on the exam.

Attendance. It is expected that students taking a graduate class will attend every class meeting, will arrive on time, and will actively participate in each class. Absences and late arrivals will not be tolerated. If you must miss class because of illness or other emergency, please try to notify the instructor in advance. You are still responsible for any work missed during an absence.

Academic Honesty Policy: All portions of the Auburn University student academic honesty code (Title XII) found in the *eHandbook* will apply to university courses. All academic honesty violations or alleged violations of the SGA Code of Laws will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee.

Cell Phones. As a courtesy to everyone, please turn off your cell phone during class. If you have a compelling reason for leaving your phone on, please let me know at the beginning of class. Also, please do not text–message during class.

Best Work. Please take pride in your work and be motivated to do your best work in this class; if you are, you will gain the maximum benefit from the course.

Disability Accommodations. Students who need accommodations are asked to arrange a meeting during office hours the first week of classes, or as soon as possible if accommodations are needed immediately. If you have a conflict with my office hours, an alternate time can be arranged. To set up this meeting, please contact me by E–mail. Bring a copy of your Accommodation Memo and an Instructor Verification Form to the meeting. If you do not have an Accommodation Memo but need accommodations, make an appointment with **The Program for Students with Disabilities**, 1228 Haley Center, 844–2096.