

KINE 7670 – Laboratory Techniques in Biomechanics (3 credits)

Spring 2014

Instructor: Wendi Weimar, PhD

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Meetings:

Lecture: TR 11-12:30 PM

MC 2043 & 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 posturography
 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:

Participation: Students are expected to participate in all class discussions and participate in all homework and laboratory exercises. It is the student's responsibility to contact the instructor if assignment deadlines are not met. Students are responsible for initiating arrangements for missed work. Attendance/Absences: Attendance is required at each class meeting. If an exam is missed, a make-up exam will be given only for University-approved excuses as outlined in the Student Policy eHandbook. Arrangement to take the make-up exam must be made in advance. Students who miss an exam because of illness need a doctor's statement for verification of sickness and should clear the absence with the instructor the day they return to class. Other unavoidable absences from campus must be documented and cleared with the instructor **in advance**.

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 alternative 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 at 1244 Haley Center, 844-2096 (V/TT).

Honesty Code: The University Academic Honesty Code and the **Student Policy eHandbook** pertaining to cheating and plagiarism will apply to this class.
Email: TigerMail is the official means of communication for Auburn University. The instructor will communicate with the class through Tiger Mail. You are responsible for this information, so please check your account regularly.

Contingency Plan: If normal classes are disrupted due to a high number of students experiencing illness or an emergency or crisis situation (such as a widespread H1N1 flu outbreak), the syllabus and other course plans and assignments may be modified to allow completion of the course. If this occurs, an addendum to your syllabus and/or course assignments will replace the original materials. Additionally, course content and assignments may be made available to you via Canvas.
Questions/ Help: Students are encouraged to ask questions and seek extra help on a regular basis. Please do not wait until the day before an exam.

Classroom and Laboratory Policies:

- All electronic devices must be turned off during classroom or laboratory periods, with the exception of laptops, which may be used for note taking only. NO phones or text messaging during class is allowed. All phones and electronic devices must be put away prior to the start of class. If these are found out – The student will be asked to leave the class.
- Students are expected to arrive to class on time. Those arriving late will not be permitted to hand in homework. Likewise, classes will end promptly at the scheduled time.
- Students are expected to come to class having completed the reading and prepared to discuss them.
- While the laboratory sessions are more relaxed, students are expected to conduct themselves in professional and safe manner. Students are not permitted to play with laboratory equipment.
- Lab attire consists of loose fitting gym shorts, t-shirts, and sneakers for easy movement. In order to participate in laboratory sessions, students must arrive to class in appropriate attire. Students not properly dressed will be asked to leave and will not be allowed to make up the assignments.

Professionalism: As faculty, staff, and students interact in professional settings, we are expected to demonstrate professional behaviors as defined in the College's conceptual framework. These professional commitments or dispositions are listed below:

- ☐ Engage in responsible and ethical professional practices
- ☐ Contribute to collaborative learning communities
- ☐ Demonstrate a commitment to diversity
- ☐ Model and nurture intellectual vitality