KIN 430 Biomechanics
Spring Semester 2012

Lead
Instructor
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Teaching
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Office Hours: Check the course blog (web address below) for TA office hours.
Also check the blog for the names of the undergraduate TA’s and their office hours.

Course Description
Introduction to mechanics and its application to human motion. Includes linear and angular kinematics and kinetics,
mechanics of fluids, and elementary analysis of human motion.

Prerequisites: MATH 127, 128; PHYSICS 131, 133; KIN 270
In particular, students are expected to have a working knowledge of Newton’s laws of motion.

Goals
This course was designed to help students develop an understanding of biomechanical concepts as they apply to the analysis
of human movement. The emphasis will be on both describing and identifying the causes of basic human movements, such as
walking, jumping, and activities of daily living. Attention will also be paid to understanding the biomechanical differences
between groups, such as men versus women, adults versus children, and elite athletes versus physically challenged.

Objectives
By the end of this course, students should be able to:
1. Describe linear and angular human movements using appropriate anatomical and kinematic terminology.
2. Apply Newton’s laws of motion to indentify the causes of linear and angular human movements.
3. Demonstrate their proficiency with objectives 1 and 2 both computationally and conceptually.
4. Identify biomechanical factors that underlie differences in movement capabilities between groups.
5. Summarize the basic concepts and procedures involved in performing an inverse dynamics analysis of human movement.

Meeting Times
Lecture: Tu/Th 1:00 pm - 1:50 pm
Bartlett Hall, Room 65
Lab Sect 1: Wed 12:55 pm - 2:25 pm
Totman Building, Room 10
Lab Sect 2: Wed 2:30 pm - 4:00 pm
Totman Building, Room 10
Lab Sect 3: Wed 4:40 pm - 6:10 pm
Totman Building, Room 10
Lab Sect 4: Thur 9:30 am - 11:00 am
Totman Building, Room 10
Lab Sect 5: Thur 11:15 am - 12:45 pm
Totman Building, Room 10

Note: You must attend the lab section you are registered for. If you need to attend a different section on a one-time basis, for a documented reason, you must make arrangements with the teaching assistant prior to the week in which you desire to switch sections.

Course Text: Biomechanical Basis of Human Movement, 3rd Edition
J. Hamill & K. M. Knutzen
Lippincott, Williams & Wilkins, 2009
Additional readings will also be assigned

The course text can be obtained from the UMass Textbook Annex or from various online sources. If you order the book online, make sure you get the 3rd edition, published in 2009.
Course Blog (http://blogs.umass.edu/kin430)
The course blog will be the main form of communication used outside of class times. Additionally, some materials will only be made available on the blog (e.g., assignments, lab handouts, lecture notes). Students are responsible for checking the blog on a regular basis, in order to obtain these materials at the appropriate times. Note: at some point during the semester, we may switch over to using Moodle instead of the blog -- this will be announced in class.

Attendance Policy

Lecture: Attendance will not be taken in lecture, and is not a formal part of the final course grade. However, prior experience shows that students who attend class regularly tend to perform much better on the exams. With very few exceptions, people who have failed the course in the past had poor attendance records.

Lab: Attendance will be taken for labs, and will factor into the final course grade. In the event that a student misses lab for an excused reason (e.g., documented illness or accident, religious holiday), they will be given the opportunity to “make up” the missed lab. Otherwise, the student will receive a grade of zero for that lab.

Missed Exams: If a student misses the midterm or final exam, due to a documented medical emergency or other extenuating circumstance, they will be given an alternate exam as a make up. Otherwise, the student will receive a grade of zero on the missed exam.

Course Evaluation

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm Exam</td>
<td>100 points</td>
</tr>
<tr>
<td>Final Exam</td>
<td>100 points</td>
</tr>
<tr>
<td>Lab Component</td>
<td>75 points (55 for lab reports, 20 for lab quizzes)</td>
</tr>
<tr>
<td>Problem Sets</td>
<td>75 points</td>
</tr>
</tbody>
</table>

Total: 350 points

Grading:

- no grades of A+ 93-100% = A 90-92.9% = A-
- 87-89.9% = B+ 83-86.9% = B 80-82.9% = B-
- 77-79.9% = C+ 73-76.9% = C 70-72.9% = C-
- 67-69.9% = D+ 63-66.9% = D 60-62.9% = D-
- below 60% = F

To calculate your course grade as a percentage at any time during the semester, divide the number of points earned so far by the number of point available so far (350 at the end of the semester), and multiply the result by 100. Scores will be rounded to one decimal place: for example, 87.34 = 87.3% and 87.35 = 87.4%.

Notes:

1. Some laboratory activities will have reports that must be completed and submitted to receive full credit. Unless otherwise noted, laboratory reports must be typed, and will be due 1-2 weeks after the laboratory session in which they were assigned, as indicated by your laboratory instructor.

2. There are no mechanisms by which “extra credit” can be earned in this course. Students are encouraged to keep up with the classroom material and assignments, so that they do not fall behind.

3. It is expected that all students will abide by the Code of Student Conduct with regard to classroom behavior, examinations, and submission of labs and assignments. Instances of cheating, plagiarism, or other violations can result in penalties ranging from lowering of the course grade to expulsion from the university. For further information, review the Code of Student Conduct document, which is available on the Dean of Students web site (http://www.umass.edu/dean_students/).

4. Students with a documented physical, psychological, or learning disability on record with Disability Services may be eligible for reasonable academic accommodations to help them succeed in this course. Students requiring an accommodation should notify their instructor within the first two weeks of the semester to make appropriate arrangements.