



Kin 385 – 1

Biomechanics

Semester: Winter, 2015
Days: Tues. / Thurs. 9:45-11:00
Room: A 2210
Lab – day: N/A
Lab–Room: N/A

Number of credits: 3

Prerequisite:
Zoology 261 and 263

Instructor: Dr. Carol Gibbons Kroeker
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Office: A 2156
Office hours: By appointment
 Tues / Thurs 11-1

Course Description:

This course will cover the biomechanical properties of tissues and organs and will discuss the effects of these properties on function. Methods for the analysis of deformational mechanics will be introduced as they apply to biological tissues including bone, muscle, and connective tissues. Analysis of movement will also be discussed at a biomechanical level.

Further Course Information:

Pre-requisites: Zoology 261 and 263. Physics 111 is recommended.

Although there is no formal laboratory or tutorial session, informal exercises will be required to be completed outside of class time.

Expected Learning Outcomes:

It is the aim of the course that students acquire the following skills:

1. Students will gain an understanding of the principles of physics and mechanics as they apply to body movement and function.
2. Students will learn the biomechanical properties of various body tissues and the effects of these properties on function and the mechanical design of various animals
3. Students will learn methods for the analysis of deformational mechanics as they apply to biological tissues including bone, muscle, and connective tissues.
4. Students will analyze body movements at a biomechanical level.

Important Dates:

First day of classes: January 7, 2015
Registration revision period: January 18, 2015
Last day to request revised examination: March 2, 2015
Last day to withdraw from course: March 20, 2015
Last day to apply for time extension for coursework: March 30, 2015
Last day of classes: April 10, 2015

Final Exam: Fri. April 17, 2015
Time: 9:00 AM – 12:00 PM
Room: A2133

Outline:

<u>Dates</u> <u>Week of</u>	<u>Topic</u>	<u>Text Chapters</u>
Jan. 7	Fundamentals of Biomechanics	1, 2
Jan. 12	Forces and Motion	3
Jan. 19	Linear and Angular Kinematics	5, 6, 7
Jan. 26	Soft Tissue Mechanics - Stress and Strain	
Feb. 2	Biomaterials / soft tissues	
Feb. 9	Mechanical properties of bone	8
Feb. 16	Reading Break	
Feb. 23	Mechanical properties of Bone, Ligaments, and Tendons / Midterm	8
Mar 2	Mechanical properties of blood vessels	
Mar 9	Fluid Mechanics / Blood Flow	
Mar 16	Mechanical properties of the heart and lungs	
Mar 23	Mechanical properties of the cervix, skin, and bladder	
Mar 30	Movement – Running, jumping, flight	11, 12
Apr. 6	Swimming, crawling - Review	

If a section does not have a textbook chapter, then journal papers will be assigned.

Laboratory Schedule

Independent lab topics will include: Anatomy and Physiology of the skeletal and muscular system, flow dynamics of the cardiovascular system, Mechanical properties of animal systems, linear kinetics and kinematics, angular kinetics and kinematics.

While there will be some experimental work, this will be supplemented with case study and journal paper reviews.

Grading Scheme

The course grade will be based on a midterm and final exam, as well as assignments (paper critique and presentations). Case studies and inquiry-based learning will be used in the class - Student participation is expected in the form of discussion and presentation.

Requirements:

This course will be presented in a seminar format – with independent learning, discussion periods, and student presentations, as well as lectures. The midterm and final exam will be a combination of multiple choice questions, as well as short and long answer questions. While most questions will be based on lecture material, the textbook reading will absolutely help in the understanding of this material.

Submission of Assignments:

Assignments will be handed in during class time. There will be a 10% deduction in grade per day that an assignment or lab report is handed in late. No assignments will be accepted past one week late. If there are extenuating circumstances resulting in the lateness, please contact the instructor.

Attendance:

While attendance at lectures is not mandatory, it will help ensure success on course exams and assignments.

Evaluation:

Mark Distribution	:	1 Midterm Exam	25%
		Assignments	25%
		Presentation / Paper Critique	10%
		Final Exam	40%

Grade Summary:

The available letters for course grades are as follows:

Grade	Percent	Grade Point Value	Description
A+	96-100	4.00	Outstanding
A	92-95	4.00	Excellent - superior performance, showing comprehensive understanding of subject matter.
A-	88-91	3.70	
B+	83-87	3.30	
B	78-82	3.00	Good-clearly above average performance with knowledge of subject matter generally complete.

B-	73-77	2.70	
C+	68-72	2.30	
C	64-67	2.00	Satisfactory – basic understanding of the subject matter. Grade point average below 2.00 is not sufficient for promotion.
C-	60-63	1.70	Minimum grade required if needed as a prerequisite course
D+	55-59	1.30	
D	51-54	1.00	Minimal pass – marginal performance; generally insufficient preparation for subsequent courses in the same subject.
F	<50	0	Fail – unsatisfactory performance or failure to meet course requirements.

Textbooks:

Fundamentals of Biomechanics, Duane Knudson, Springer-Verlag
(On-line version available for down-load)

Policies:

All students have received an Ambrose e-mail account upon registration. It is the student's responsibility to check this account regularly as the Ambrose email system will be the professor's instrument for notifying students of important matters (Cancelled class sessions, extensions, requested appointments, etc.) between class sessions. If students do not wish to use their Ambrose accounts, it is highly recommended that they forward all messages from the Ambrose account to the other account.

During the **Registration Revision Period** students may to enter a course without permission, change the designation of any class from credit to audit and /or voluntary withdraw from a course without financial or academic penalty. These courses will not appear on the student's transcript. Courses should be added or dropped on the student portal by the deadline date, please consult the List of Important Dates. After that date, the original status remains and the student is responsible for related fees.

Students intending to withdraw from a course after the Registration Revision Period must apply to the Office of the Registrar by submitting a Request to Withdraw from a Course by the **Withdrawal Deadline**, please consult the List of Important Dates. Withdrawal from courses after the Registration Revision period will not be eligible for tuition refund. A grade of "W" will appear on the student's transcript.

Students wishing to withdraw from a course, but who fail to do so by the applicable date, will receive the grade earned in accordance with the course syllabus. A student obliged to withdraw from a course after the Withdrawal Deadline because of health or other reasons may apply to the Registrar for special consideration.

Students, who find a conflict in their exam schedule must submit a **Revised Examination** Request form to the Registrar's Office by the deadline date, please consult the List of Important Dates. Requests will be considered for the following reasons only: 1) the scheduled final examination slot conflicts with another exam; 2) three final exams within three consecutive exam time blocks; 3) the scheduled final exam slot conflicts with an exam at another institution; 4) extenuating circumstances. Travel is not considered a valid excuse for re-scheduling or missing a final exam.

Electronic Etiquette

Students are expected to treat their instructor, guest speakers, and fellow students with respect. It is disruptive to the learning goals of a course or seminar and disrespectful to fellow students and the instructor to engage in electronically-enabled activities unrelated to the class during a class session. Please turn off all cell phones and other electronic devices during class. Laptops should be used for class-related purposes only. Please do not use iPods, MP3 players, or headphones. Do not text, read, or send personal emails, go on Facebook or other social networks, search the internet, or play computer games during class. The professor has the right to

disallow the student to use a laptop in future lectures and/or to ask a student to withdraw from the session if s/he does not comply with this policy. Repeat offenders will be directed to the Dean. If you are expecting communication due to an emergency, please speak with the professor before the class begins.

Academic Policies

It is the responsibility of all students to become familiar with and adhere to academic policies as stated in the Academic Calendar. Personal information, that is information about an individual that may be used to identify that individual, may be collected as a requirement as part of taking this class. Any information collected will only be used and disclosed for the purpose for which the collection was intended. For further information contact the Privacy Compliance Officer at privacy@ambrose.edu.

Extensions

Although extensions to coursework in the semester are at the discretion of the instructor, students may not turn in coursework for evaluation after the last day of the scheduled final examination period unless they have received permission for a “**Course Extension**” from the Registrar’s Office. Requests for course extensions or alternative examination time must be submitted to the Registrar’s Office by the deadline date, please consult the List of Important Dates. Course extensions are only granted for serious issues that arise “due to circumstances beyond the student’s control”.

Appeal of Grade

An appeal for change of grade on any course work must be made to the course instructor within one week of receiving notification of the grade. An appeal for change of final grade must be submitted to the Office of the Registrar in writing within 30 days of receiving notification of the final grade, providing the basis for appeal. A review fee of \$50.00 must accompany the appeal to review final grades. If the appeal is sustained, the fee will be refunded.

Academic Integrity

We are committed to fostering personal integrity and will not overlook breaches of integrity such as plagiarism and cheating. Academic dishonesty is taken seriously at Ambrose University as it undermines our academic standards and affects the integrity of each member of our learning community. Any attempt to obtain credit for academic work through fraudulent, deceptive, or dishonest means is academic dishonesty. Plagiarism involves presenting someone else’s ideas, words, or work as one’s own. Plagiarism is fraud and theft, but plagiarism can also occur by accident when a student fails or forgets to give credit to another person’s ideas or words. Plagiarism and cheating can result in a failing grade for an assignment, for the course, or immediate dismissal from the university. Students are expected to be familiar with the policies in the current Academic Calendar that deal with plagiarism, cheating, and the penalties and procedures for dealing with these matters. All cases of academic dishonesty are reported to the Academic Dean and become part of the student’s permanent record.

Students are strongly advised to retain this syllabus for their records.

Other

Classroom Etiquette:

It is expected that students will take an active role in the learning process. This includes: (a) regular class attendance, (b) reading course material in advance of class, and (c) engaging in discussions during class.

In respect to the professor and to your fellow students, we ask that you:

- a) Turn your phone off during class and that you don’t use it for texting during lecture or lab
- b) Not have conversations with the people beside your during lecture – it is very distracting to the people around you
- c) Use your laptops for lecture material and assignments only – that you are not using the internet or facebook during class time.
- d) Arrive to lecture and lab on time
- e) Don’t come to class or lab with your ipod or equivalent.

These will help to maximize the learning experience for you and your fellow students (and will keep your professor in a good mood).
