

KINE 7660 – Biomechanics of Sport Injury and Rehabilitation (3 cr.)

Dr. Gretchen Oliver, FACSM, ATC, LAT

Office: 105 Kinesiology Building

Office Hours: by appointment

Phone: 334.844.1497

Email: goliver@auburn.edu

Course Meetings:

11:00-12:30 M-F 2040 Memorial Coliseum

Text: Nordin, M. & Frankel, V.H. (2012). Basic Biomechanics of the Musculoskeletal System. (4th ed) Philadelphia, PA: Lea & Febiger. ISBN-13:978-1-60913-335-1

Course Description:

Study of biomechanical properties of human body, and force-motion relationships within the musculoskeletal system; pathomechanics and tissue properties that define the tolerance of the human body to the forces and torque developed in sport and daily activities; techniques for prevention of injuries in sport and daily activities.

Course Objectives: The students will understand:

1. The morphology, histology, and mechanics of bone, cartilage, ligament, tendon and muscle as they relate to biomechanics;
2. Biomechanical properties of the human body as a function of age, gender, and activities;
3. Selected injury and injury-repair mechanics of the different biomaterials in humans.

Course Requirements:

Quizzes, Joint lock paper, Injury presentation, midterm and final.

Grading and Evaluation Procedure:

	90 - 100 --- A
Joint lock.....20%	80 - 89 --- B
Injury Paper & Poster.....20%	70 - 79 --- C
Mid Exam.....20%	60 - 69 --- D
Final Exam25%	Under 60 --- F

Class Policy Statements:

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.

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 *Student Policy eBook* 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.

Academic Honesty Policy: All portions of the Auburn University student academic honesty code (Title XII) found in the *Student Policy eBook* 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.

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 (VIT).

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.

Course Contingency: If normal class activities are disrupted due to illness, emergency, or crisis situation, 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.

Student Academic Grievance Policy: The purpose of this university policy is to “resolve academic grievances of students, which results from actions of faculty or administration. This resolution should be achieved at the lowest level and in the most equitable way. The burden of the proof rests with the complainants.” See *Student Policy eBook* for steps toward redress.

Professionalism: As faculty, staff and students interact in professional settings, they 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

Course Contents:

Week 1. Introduction to course and material properties

Week 2. Material properties of bone, articular cartilage, muscle and nerve

Week 3. Material properties and injury mechanisms of ankle, knee and hip

Week 4. Material properties and injury mechanisms of shoulder, elbow and wrist

Week 5. Biomechanics of modalities

Joint Lock Project

The purpose of this project is to use a controlled joint action that may elicit an injury if progressed too far.

- (1) Chose a joint lock to study
- (2) Describe the method in which it is applied
- (3) Describe the anatomy involved in the lock
- (4) Describe what structures are being placed at risk and why
- (5) Describe how these structures could be placed at greater risk (what can the attacker do?)
- (6) Describe how the stresses could be diminished on these structures (what can the “victim” do?)
- (7) Be sure to have a cover page and reference any material that you use to make your case.

Paper & Poster

To write a paper and prepare a poster presentation regarding a specific sports injury. You are being asked to prepare a poster presentation in a power point template that you would present at a national conference. [slide dimensions: 33 width X 46 height]. A sample template will be uploaded on canvas.

PURPOSE:

- 1) To provide the student the opportunity to synthesize and apply the information presented in this course.
- 2) To provide the student the opportunity to interact with the information in greater detail.
- 3) To develop critical thinking skills and critical analysis of research relevant to the course.
- 4) To develop and practice presentation skills.

SCORING:

The following should be included in your **PAPER**

- 1) Clearly stated purpose
- 2) Thorough description of the structures of the injury site (i.e., anatomy)
- 3) How these structures contribute to the injury site susceptibility or why this location is susceptible to this kind of injury
 - a) are the structural components arranged in such a manner that the structure is susceptible to injury?
 - b) is the site situated at a point along the body that makes it more prone to injury?
 - 1) based on anatomy of the body
 - 2) based on the activity (example: the glove hand of a catcher)
- 4) Concise presentation of research regarding this injury
- 5) Thorough review of the mechanism(s) of injury
 - a) how does the site become injured?
 - b) what events lead up to the injury?
 - c) what factors affect the severity of the injury?
- 6) Prevention
- 7) Treatment
- 8) Conclusions/Summary
 - a) summarize your research
 - b) draw some conclusions based on your interpretation of all that you have read for this project

POSTER

- 1) Did you include figures of the injury?
- 2) Did you present the point clearly and did you make a case for why it is important and relevant information?
- 3) Did you just copy and paste your paper in a poster, or do you present the relevant material appropriate for a poster presentation?
- 4) Are the aesthetics pleasing?