BIM 233 – Soft Tissue Mechanics  
Winter 2017

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Objectives:  
This course will present the structure and function of various soft tissues of the musculoskeletal system, including articular cartilage, tendon, ligament, meniscus, and intervertebral disc. Students will learn the engineering principals governing the mechanical behavior of these tissues, in particular linear viscoelasticity, quasilinear viscoelasticity, and biphasic theory, along with experimental methods used for mechanical testing of these tissues.

Grading:  
- 30%: Three problem sets  
- 10%: Literature review presentation  
- 30%: Exam I  
- 30%: Exam II

Calendar:  
1/10/13 Introduction to class, overview of material  
1/12/13 Tendon  
1/17/13 Linear viscoelasticity  
1/19/13 Linear viscoelasticity  
1/24/13 Ligament  
1/26/13 Linear viscoelasticity  
1/31/13 Articular cartilage  
Problem set #1 due  
2/02/13 Intervertebral disc  
2/07/13 Meniscus/fibrocartilage, review of linear viscoelasticity  
2/09/13 Biphasic Theory  
Problem set #2 due  
2/14/13 Exam I  
2/16/13 Biphasic theory  
2/21/13 Quasilinear viscoelasticity/Microstructural models  
2/23/13 Articular cartilage tribology  
2/28/13 Current and emerging treatments in sports medicine  
3/02/13 Muscle and Bone  
Problem set #3 due  
3/07/13 Experimental methods  
3/09/13 Tissue Engineering  
3/14/13 Student literature review presentations  
3/16/13 Exam II

Literature Review Presentation:  
Find a recently published article (2012-present) that utilizes one of the methods discussed in this class (viscoelastic modeling, biphasic theory, etc.) to investigate one of the musculoskeletal tissues discussed in this class (tendon, ligament, intervertebral disc, etc.). Present this article to the class as you would at a scientific conference (10-12 minute Powerpoint presentation, with 3-5 minutes for questions). Be sure to describe the viscoelastic model used, and why this model was chosen to fit their data.