

Instructor:

Glen L. Niebur
147 Multi Discip Res
Phone: 631-3327
e-mail: gniebur@nd.edu AIM: gniebur@mac.com
Web: <http://bones.ame.nd.edu/ame671>

Office Hours: Mon. and Thur. 3:15 – 5:00 p.m., by appointment, or when my door is open.

Text:

Orthopaedic Biomechanics, 1st Edition (Prentice Hall publishers, ISBN 013008905)

Prerequisites:

- Mechanics of materials
- Dynamics
- A working knowledge of Matlab

Objectives:

- To learn the fundamental methods and principles of orthopaedic biomechanics
- To learn how principles of mechanics can be applied to the musculoskeletal system in order to improve diagnosis, treatment, rehabilitation of injuries and disease.

Grading:

Homework	30%
Midterm Exam	20%
Final Exam	20%
Projects	30%

Homework:

Homework assignments will be given from the textbook every one to two weeks. Working together on homework is encouraged, but you must submit your own solution. *Any subjective analysis requested on your homework should be your own!*

Projects

Two short projects will be assigned during the semester. The projects will involve a detailed analysis of a biomechanical problem. You will write a short paper describing the project objectives and results, and discuss the implications of the results. You *may* assist one another with the project, but it is *not* a group project. Each person is expected to complete the project, generate their own results, perform their own interpretation of the results, and submit their own *unique* report.

Examinations:

- Midterm: Thursday, March 8, 11:00-12:15 (tentative)
- Final: Wednesday, May 9, 11:00 – 13:00

Examinations will be closed book and notes. The final exam will be cumulative.

Week	Lecture Topics	Read
1	Introduction Basic anatomical terminology Joints and Joint force analysis	Chapter 1 and 2
2	Static, Quasi-static, and Dynamic analysis	
3	The force distribution problem, Stability	
4	Bone Mechanics Anisotropic materials	Chapter 3
5	Composite materials Tendons and Ligaments	Chapter 4
6	Cartilage, Intervertebral discs Muscle	
7	Viscoelasticity Structural Analysis of the Musculoskeletal System	Chapter 5
8	Structural Analysis of the Musculoskeletal System Midterm Exam FALL BREAK	Chapter 6
9	Structural Analysis of the Musculoskeletal System Bone Implant Systems	Chapter 7
10	Fracture Fixation Devices	Chapter 8
11	Total Hip Arthroplasty	Chapter 9
12	Total Hip Arthroplasty	
13	Total Knee Arthroplasty	Chapter 10
14	Articulating Surface Characteristics	Chapter 11
15	Summary	