

Course title and number BMEN 451/652 Cell Mechanobiology
 Term Spring 2012
 Meeting times and location Monday/Wednesday/Friday 9:10 in ETB 1003

Course Description and Prerequisites

The course will focus on how mechanical forces influence cell behavior through physical and biochemical mechanisms. The objectives include integrating engineering and cell biology to solve biomedical problems, which includes developing experimental models for applying forces to cultured cells and tissues and measuring changes in cell biochemistry, structure and function.
 Prerequisites: BMEN 282 or graduate status.

Instructor Information

Name Roland Kaunas, Ph.D.
 Telephone number 845-2412
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 Office hours By appointment
 Office location 5045 Emerging Technologies Building

Textbook and/or Resource Material

(suggested) *Cell & Molecular Biology* by Gerald Karp, John Wiley & Sons, Inc.
 Additional supplemental handouts will be provided in eLearning.

Grading Policies

Evaluation:

Undergrads:	Homework	15%	<u>Letter Grading Scale:</u>	A = 90-100
	Design Project	20%		B = 80-89
	Midterm 1 (Feb. 20)	20%		C = 70-79
	Midterm 2 (Mar. 30)	20%		D = 60-69
	Final Exam (May 4)	25%		F < 60
		100%		

Design projects will be graded based in the following areas:

Abstract	10%
Literature Review	15%
Mechanistic Model	20%
Experimental Testing	20%
Scale up	5%
Figures	15%
Grammar & Spelling	10%
Reference Section	5%

Due dates

March 21: Completed first draft of the Literature review (with Reference Section) and a 2-page outline of the Mechanistic Model and Experimental Testing sections.

April 20: Final report

Course Topics

Lecture	Topic
1	Introduction
1	Cell architecture
5	Cellular interactions with biomaterials
3	Mechanics of receptor binding
2	Arterial wall stress/strain analysis
2	Fluid mechanobiology
3	Mechanosensors
5	Mechanotransduction
5	Mechanical regulation of cell fate
7	Cytoskeletal dynamics and mechanics
4	Viscoelasticity
2	Mechanical testing of cells
<u>2</u>	Midterms
42	Final Exam (May 4, 10am-noon)

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit <http://disability.tamu.edu>

Academic Integrity

For additional information please visit: <http://www.tamu.edu/aggiehonor>

"An Aggie does not lie, cheat, or steal, or tolerate those who do."

Attendance Policy and Grading Scale Examples

"The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at <http://student-rules.tamu.edu/rule07>."