

PHYS355
Introduction to Biological Physics

Spring 2009
Herzstein Hall

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Class meetings

The class will meet Tuesday and Thursday from 1:00pm to 2:20pm, in Herzstein Hall.

Textbook

- Phillips, Kondev, and Theriot, *Physical Biology of the Cell*, Taylor & Francis, Inc. (2009), ISBN 9780815341635.

Reference Texts

- Berg, Stryer, and Tymoczko, *Biochemistry*, 6th ed., W. H. Freeman, New York (2006).
- Cantor and Schimmel, *Biophysical Chemistry, I, II, III*, W. H. Freeman, New York (1980).
- Alberts, Roberts, Walter, Johnson, and Lewis, *Molecular Biology of the Cell*, 5th ed., Taylor & Francis, Inc., New York (2007).

Course Description

This course will introduce fundamentals of biological physics. Biological physics will be defined and the basic concepts will be reviewed. Proteins and nucleic acids will be introduced. Diffusion and random walks and their application to biological systems will be described. Molecular machines such as biological motors will be presented. Folding of biomolecules and gene regulation will be visited. Finally, modern methods such as single molecule techniques and their applications to biomolecules will be discussed.

Important Dates

6 January 2009	First day of class
28 February–8 March 2009	Spring Break (no classes)
2-3 April 2009	Midterm recess (no classes)
16 April 2009	Last day of class

Honor Code

The Rice Honor Code applies.

Homework Policy

Homework assignments will be given every other week on Tuesday. Homework will be due in two weeks on Tuesday in class. Late homework will not be accepted. You are allowed to collaborate with fellow students on your homework. You may not consult answer keys (from previous years, *etc.*). The homework you turn in must represent your own understanding.

Presentation

Each person will give a 45 minute presentation in class. The presentation should be based on a topic related to biological physics. More details will be given in class.

Credit

Homework	30 %
Term exam	30 %
Presentation	40 %

Tentative Outline of the Course

Definition and basic concepts of biological physics.

Proteins and nucleic acids.

Diffusion and random walks and their application to biological systems.

Kinetics and dynamics in the cell.

Biological motors and membranes.

Folding of biomolecules.

Gene regulation.

Modern techniques and their applications to biomolecules.

If you have a documented disability that will impact your work in this class, please contact me to discuss your needs during the first two weeks of class. Additionally, you will need to register with the Disability Support Services Office in the Ley Student Center.