

PHYS551
Biological Physics

Spring 2007
118 Herzstein Hall

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Class meetings

The class will meet Tuesday and Thursday from 1:00pm to 2:15pm, in 118 Herzstein Hall.

Textbook

- Philip Nelson, *Biological Physics*, W. H. Freeman and Company (2004), ISBN 0716743728.

Reference Texts

- R. M. J. Cotterill, *Biophysics: An Introduction*, Wiley, John & Sons (2002).
- M. Daune, *Molecular Biophysics: Structures and Dynamics*, Oxford University Press (1999).
- L. Stryer, *Biochemistry*, 5th ed., W. H. Freeman, New York (2003).
- Cantor and Schimmel, *Biophysical Chemistry, I, II, III*, W. H. Freeman, New York (1980).
- D. A. McQuarrie, *Statistical Mechanics*, Harper & Row, New York (1976).

Course Description

This course will cover fundamentals of biological physics. The basic concepts will first be reviewed. The cells and their components will be visited briefly. Diffusion and random walks and their application to biological systems will be described. Entropy and energy concepts and their roles in biological systems will be discussed. Molecular machines will be introduced. Finally, modern methods such as AFM, single molecule techniques, and their applications to molecular motors will be presented.

Important Dates

8 January 2007	First day of class
5–9 March 2007	Midterm recess (no classes)
5–6 April 2007	Spring recess (no classes)
25 April 2007	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 the following Tuesday. 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. Homework solutions will be available one week after it is due.

Presentation

Each person will give a 45 minute presentation in class. The presentation should be based on a topic related to biological physics of your choice.

Credit

Homework	50 %
Presentation	50 %

Tentative Outline of the Course

The cells and their components
Diffusion, random walks, and friction in biology
Entropy and free energy
Chemical reactions
Cooperative Transitions in Macromolecules
Enzymes and Molecular Machines
Biological Membranes
Modern Methods in biological Physics

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.