

## **Physics 4251 - Biological Physics**

Fall 2007, MWF at 2:05am-2:55am in Howey S204}

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**Office Hours:** Friday 3pm-4pm or by appointment.

**Prerequisite:** Thermal physics or thermodynamics.

### **Overviews:**

- Concept of heat and entropy and free energy (useful energy).
- Gross anatomy of cell and how biological systems function
- Developing quantitative models and physical intuition of biological systems.
- Random walks, diffusion, physics at low Reynolds number.
- Self-assembly, physical transitions in macromolecules (DNA, RNA, proteins).
- Enzymes, molecular motors, cell membranes, ion channels, nerve impulses, viruses, retroviruses.

### **Textbook**

- "Biological Physics", Phillip Nelson, Freeman and Company, 2007

### *Recommended reading:*

Any biology textbook, for example "Molecular biology of the cell"  
by Bruce Alberts et al, Garland Science, 4<sup>th</sup> Ed., 2002.

### **Grading:**

Homework (weekly or biweekly, due on Wed.), 25%  
First mid-term exam, week 7<sup>th</sup> (10/01) , 20%  
Second mid-term exam, week 12<sup>th</sup> (11/05), 25%  
Final exam, 30%