

BIPH 11a: SEMINAR IN BIOLOGICAL PHYSICS
Spring 2007

Instructor: Azadeh Samadani, Room 221, E-mail: azadeh@brandeis.edu

Office Hours: by appointment

Meeting Place and Time: Physics building, Room 239, Tuesday, 1:40PM – 3:00PM

Required course work:

Homework will be handed out in class, usually one every week. These will include both reading assignments and quantitative problems. A term paper will be due around the last day of classes. There will be no written exams, but you will be asked to prepare a short presentation on your term paper topic at the end of the semester.

Grading Procedure:

40% – Homework. 40% – Term paper. 20% – Presentation.

Course Description:

We will study physical forces in living matter at the molecular scale. Topics in this course include:

Random walks in biology,
Elements of probability theory,
Diffusion,
Bacterial swimming strategy and chemoatxis,
Eukaryotic cells motility and chemotaxis,
Entropic forces,
The Boltzman factor,
Polymers as random walks, and
The statistical mechanics of gene regulation

We will study these and many other examples of biological physics in action. Furthermore, we will develop the math and physics tools necessary to build quantitative models for the goings on inside the cell.