

Course Information

PHYS 335 and PHYS 659, "Biophysics"

3 credit hours

Fall 2014. Faraday West 227

Course website on blackboard

Instructor Information

Professor: Laurence Lurio

Office location: La Tourette 202 (back of physics office)

Phone: 815 753 6470

Email: llurio@niu.edu

Office Hours: Friday: 2:00 – 3:00. I am also available directly after class.

Course Description: An introduction to biophysics, applying the principles of physics to biology in order to understand the fundamental basis of how living organisms function. The focus of this course is biophysics at the cellular level. It is a joint graduate/undergraduate linked course (PHYS 335 and PHYS 659). The graduate section will cover the same topics as the undergraduate section but will do additional homework problems and additional readings from professional journals. The course will consist of three parts. The first is an introduction to the basic scientific principles underlying biophysics. The second part of the course will review experimental methods in biophysics. The final part of the course will survey applications of biophysics.

Intended Learning Outcomes: Students taking this course will acquire an understanding of how to apply the basic principles of mechanics, electricity and magnetism, thermodynamics and fluid mechanics towards the understanding of biologically relevant systems. They will become familiar with the experimental tools used to perform biophysical systems. Students will study a selection of biophysical topics in-depth in order to see how biophysical measurements and theoretical methods can be used.

Student Assessment:

Student grades will be based on weekly homework sets, in-class discussion, two papers and two oral presentations. Discussions will be based on the homework and on discussion questions handed out in advance. Students will prepare papers on two topics over the course of the semester. The first topic will be on one of the experimental method from chapter 6 of the textbook. The second topic will be on an application of biophysical methods discussed in chapters 7-12 of the text. Undergraduates should identify an article on their topic from the scientific literature and then explore the references in their paper as well as additional readings from the web and textbooks in order to fully understand the article. Graduate personations and papers must focus on at least two related articles and compare their results. For each topic, students will hand in a first draft of their paper a week before their oral presentation. This first draft will be graded. Students will then present a 15 minute oral presentation based on the draft paper. Based on comments from the instructor and from comments from the class during the oral presentation students will present a revised paper. The first draft paper, the oral presentation and the revised paper are counted equally and are each worth 10% of your grade. Late assignments will not be marked down if students meet with the professor in advance and agree on a revised due date. Otherwise, late assignments will be marked down one letter grade.

- a. Weekly homework sets (20%)
- b. In-class discussion (20%)
- c. Oral presentations. (two 15 minute presentations) (20%)
- d. Papers. (5-7 pages) (40%). The first draft and the revised draft are given equal credit.
- e. There is no final exam

Textbook:

The textbook for the class is "Biophysics, an Introduction" by Rodney Cotterill. Additional readings and sources will be posted to the course blackboard page.

Attendance: The course does not have a specific attendance policy. However, 20% of your grade is based on class participation.

Academic Integrity: Students are expected to hand in their own work. This includes homework problems as well as material presented in papers and oral presentations. Students may discuss the concepts of homework problems with each other but cannot share answers.

Students with disabilities:

If you need accommodation contact the Disability Resource Center (815-753-1303) drc@niu.edu. You should also contact me privately.

Calendar

August						Due Dates
26	Ch 1	Bonds	28	1	Bonds	
Sept						
2	Ch 2	Binding	4	2	Binding	
9	Ch 3	Energies	11	3	Energies	
16	Ch 4	Kinetics	18	4	Kinetics	
23	Ch 5	Transport	25	5	Transport	
30	Ch 6	Techniques				draft paper 1 (Sept 30)
Oct						
			2	6	Techniques	
7		Oral present.	9		Oral present.	
14	Ch 7	Biopolymers	16	7	Biopolymers	
21	Ch 8	Membranes.	23	8	Membranes	revised paper 1 (Oct 23)
28	Ch 9	Energy	30	9	Energy	
Nov						
4	Ch 10	Movement	6	10	Movement	first draft paper 2 (Nov 4)
11	Ch 11	Bioelectricity	13	11	Bioelectricity	
18	Ch 12	Nerve signals	20	12	Nerve signals	
25	12	Nerve signals	Thanksgiving			
Dec						
2		Presentation	4		Presentation	
6						revised paper 2 (Dec 6)