# Physics 471E -- Advanced Topics in Physics: Biophysics -- Fall 2016

| Instructor       | Renate Wackerbauer,  
|                  | Office Location: NSCI 106  
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| Open office hours| Walk-ins are very welcome; appointments help; email is effective for straightforward questions.  
| Course info      | Phys471E, 1 credit  
| Prerequisites    | Phys220 and Phys301, or instructor's permission  
| Lectures         | MF 3:30 to 4:30 pm, W 4:40-5:40, NSCI 207  
|                  | The lectures will explore in depth material presented in the text  
| Noyes Lab        | Access to the Noyes Computer Lab (Rm 101 NSCI) is provided to all students enrolled in a Physics course. Your polar express card lets you in.  
| Text             | We use various text sources (material handed out in class) 
|                  | --Biological Physics, by Philip Nelson, Freeman and Company, 2008  
|                  | --Mathematical Foundations of Neuroscience, by Ermentrout and Terman, Springer 2012  
|                  | other readings:  
| Course Content   | Introduction into Biophysics -  
|                  | Biochemical reactions, transport and diffusion in cell membranes, membrane potential, neuron models, propagation of activity  
| Tentative course calendar | This course provides a brief introduction into the mathematical modeling of biological systems. We consider the generation of order in biological systems; discuss transport at the microscopic level. Mathematical modeling is explored in the context of a a nerve membrane.  
| Course Goals     | Students learn,  
|                  | *how to model biological processes focusing on differential equations  
|                  | *how to simulate biological processes on a computer  
|                  | *to apply physical concepts to a different scientific discipline  
|                  | *how to address interdisciplinary tasks with a physics background  
| Student Learning Outcomes | Homework will be assigned weekly and will be due by 3:30 pm on the following Monday, unless explicitly altered at the time of assignment. Late homework will not be accepted. Finished homework should be placed in the designated box in the main office of the Physics Department. Homework assignments and solutions will be posted in the glass case in the Physics Department hallway. I HIGHLY appreciate it if you RECYCLE paper for your homeworks!  
| Homework         |  
| homework         |  
| assignments      |  
| Examinations     |  

A one-hour in-term final examinations will be held during the semester. The exam will be closed books and closed notes.

| Final exam | Monday, Oct 3, in class | Class material and Lectures |

Homework: The maximum score for each homework will be 100 points. *Illegible work will not be graded.*

Project: Explore the wide field of Biophysics in a project that will be presented to class in a 10 minute talk. Choose an application of a physical concept from fluid mechanics, mechanics, electricity and magnetism, or quantum mechanics in the broad field of biological physics. Browsing through articles in Physics Today or books on biological systems is a good starting point to find such a project.

Evaluation of the presentation:

*Grades A - D (including +/-) are assigned equal weight for total credits between 50% and 100% (A: >87.5%, B: >75%, C: >62.5%, D: >50%). For the final grade homeworks, presentation, and exam will be weighted as follows:*  

| Homework | 40% |
| Project presentation | 30% |
| Final exam | 30% |

Attendance at lectures is expected. Active class participation, questions, comments on newspaper articles on biological physics are extremely welcome in the lectures. A missed exam will receive 0 credit unless the instructor is notified by email, phone, etc before the exam starts. Make-up exams will be individually scheduled with the student.

As students of UAF, you are bound by the policies and regulations of the University of Alaska, UAF rules and procedures, and the Student Honor Code. You are obligated to make yourselves familiar with all conditions presented in the UAF Catalog. *Plagiarism on homework, or on exam will result in a failing grade.*

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. If you have any kind of dissability, please ensure that you go to the disabilities services program coordinator. I will work with the office of disabilities services (203 WHIT, 474-7043) to provide reasonable accomodations to students with disabilities.