Physics 471E -- Advanced Topics in Physics: Biophysics -- Spring 2021

Instructor	Renate Wackerbauer, Office Location: REIC106 phone: 474-6108 e-mail: rawackerbauer@alaska.edu
Open office hours	Due to Covid19 there are no walk-in office hours unless the situation improves; meeting via zoom works; email is effective for straight-forward questions. additional recitation classes can be scheduled on request. homework questions can be discussed during/before class.
Course info	Phys471E, 1 credit
Prerequisites	Phys220 and Phys301, or instructor's permission
Lectures	MWF 1 to 2pm, REIC 203 The lectures will explore in depth material presented in the text Lectures will be/start f2f; they will be recorded, uploaded to "google classroom", and shared with all students in class. Due to the fluid situation with covid, the course modality can change throughout the semester. In the case of online course delivery, lectures would be offered synchronously (tablet with whiteboard), recorded, and uploaded into google classroom.
Noyes Lab	Access to the Noyes Computer Lab (REIC 101) is provided to all students enrolled in a Physics course. Your polar express card lets you in.
Text	We use following text that is available through the library (some exerpts can be made available if there is a need) --Biological Physics, by Philip Nelson, Freeman and Company, 2008 other readings for interest: --Mathematical Foundations of Neuroscience, by Ermentrout and Terman, Springer 2012 --Mathematical Physiology, by Keener and Sneyd, Springer (1998) --Mathematical Biology, by Murray, Springer (2002) --Computational Cell Biology, by Fall, Marland, Wagner, and Tyson, Springer (2002)
Course Content Tentative course calendar	Introduction into Biophysics - Biochemical reactions, transport and diffusion in cell membranes, membrane potential, neuron models, propagation of activity
Course Goals	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 nerve membrane.
Student Learning Outcomes	Students learn, *to apply physical concepts to a different scientific discipline *how to address interdisciplinary tasks with a physics background *how to model biological processes focusing on differential equations *how to simulate biological processes on a computer

Homework homework assignments	Homework will be assigned about weekly and will be due by 3pm on the due dates. ***Late homework will not be accepted***. Finished homework should be uploaded as a pdf-file to "google classroom"
Examination	A one-hour in-term final examinations will be held during the semester. The exam will be closed books and closed notes. Final exam | friday, feb 12, in class | Class material and Lectures
Grading	**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 physics is a good starting point to find such a project. Evaluation of the presentation

	discrimination against any individual: https://alaska.edu/nondiscrimination/. Your instructor follows the University of Alaska Fairbanks Incomplete Grade Policy: “The letter “I” (Incomplete) is a temporary grade used to indicate that the student has satisfactorily completed (C or better) the majority of work in a course but for personal reasons beyond the student’s control, such as sickness, has not been able to complete the course during the regular semester. Negligence or indifference are not acceptable reasons for an “I” grade.” Effective communication: Students who have difficulties with oral presentations and/or writing are strongly encouraged to get help from the UAF Department of Communication's Speaking Center (907-474-5470, speak@uaf.edu) and the UAF English Department's Writing Center (907-474-5314, Gruening 8th floor), and/or CTC's Learning Center (604 Barnette Street, 907-455- 2860).