BIOM/ECE 526 – online section
Biological Physics- Syllabus FALL 2019

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Recording times: TR, 8:00 - 9:15. Lectures will be posted right after these times.

Course website: Canvas

Reading assignments from the textbook or from other materials provided by the instructor will be given every week.

Recommended reading material
   This is an excellent biophysics text that covers most of the material of the course in much more detail than Nelson
   This is a classic cell biology book.

Recommended Math References
   Either one of these two reference books provides an excellent resource for vector analysis, coordinate systems, matrices, partial differential equations, special functions, or linear transforms.

Description: This course will introduce the field of biological physics by examining living systems quantitatively. The course is intended to train a broad student audience in mathematical and physical modeling of biological systems. All the topics covered in the syllabus will be rigorously rooted in quantitative experimental data. Emphasis will be given to understanding the techniques and instrumentation used to investigate biological systems at the nanoscale.
Homeworks: Assignments will be posted on Canvas once a week. Each assignment will be due at 8 AM, a week from the posting date. Your first and last name, homework number, and course number must be written in the first page. Your solutions to the problems must be in the correct order, they must be clear and you must include how you reach your results. Writing only the final solution is not acceptable. Homework turned in after the due date requires prior approval from the instructor.

Late assignment policy: I expect all assignments to be submitted by their due date and time with the exception of extenuating circumstances. I will not accept assignments submitted over one week after the deadline. If you become ill or the victim of an emergency, please let me know as soon as possible.

Quizzes
Quizzes will be given once a week during the lecture in order to test your knowledge but they will not be graded by the instructor. You should not use any electronic device during quizzes (including calculators, smart phones, etc.) and all quizzes are intended to be closed book.

Exams: There will be one final and one midterm exam. Exams are closed book, but you are allowed to bring one hand-written sheet of notes (front and back). You should bring to the exams a calculator, and your handwritten note sheet. The use of cell phone, smart phone, or computer is not allowed.

This course requires that all exams are proctored. Proctors are individuals who administer the exam process following the guidelines provided by Colorado State University to ensure academic integrity.

In accordance with Colorado State University proctoring guidelines, students have two options for having online exams proctored for this course:

1. Take the exam at the University Testing Center (UTC) on-campus in Fort Collins, CO. Schedule an appointment in advance by calling 970-491-6498. The cost to take an exam at the UTC is included in the cost of the course.

2. Take the exam at an accredited college or university testing center in your area. Any costs incurred due to using an outside proctor is your responsibility.
   - If you select this option, you will need to submit a Proctor Identification Form found at http://www.online.colostate.edu/proctoring/ at least two weeks prior to the first exam in the course.
   - After you submit the Proctor Identification Form, your proctor will go through an approval process that can take several days. You will receive an email once your proctor has been approved or denied.
   - Make sure to schedule an exam appointment in advance of when you plan to take the exam with your approved proctor.
It is your responsibility to select an eligible proctor, schedule exams with your proctor, and abide by all rules for bringing only appropriate materials into the testing area. Mobile or other electronic devices are strictly prohibited. You will need to provide photo identification to your proctor prior to taking any exam. Appropriate identification includes: driver's license, CSU Student ID, passport, or other government issued photo identification.

**Topics to be covered:**

- Cell components. Length, force and time scales in biophysics. Wk 1
- Brownian motion. Diffusion. Wk 1-2
- Electrophoresis. Nernst-Planck equation. Wk 3
- Transport at low Reynolds numbers. Wk 4
- Entropic forces. Wk 5
- Charged surfaces and their counterion clouds. Electroosmosis. Wk 6-7
- DNA packaging. DNA elasticity. Wk 8-9
- Molecular motors. Wk 10-11
- Membrane potentials. Ion channels. Wk 12
- Nerve impulses. Wk 13-14
- Additional concepts. Wk 15

Week numbers are approximate guidelines only.
**Method of evaluation**: Midterm exam: 30%, Final exam: 35%, Homeworks (8 best homeworks): 35%.

A+ = 98-100
A   = 94-97
A-  = 90-93
B+  = 87-89
B   = 84-87
B-  = 80-83
C+  = 76-79
C   = 65-75
D   = 50-64
F   = 0-49

The course will adhere to the **Academic Integrity Policy** of the CSU General Catalog (page 7, http://www.catalog.colostate.edu/FrontPDF/1.6POLICIES1112f.pdf) and the Student Conduct Code (http://www.conflictresolution.colostate.edu/conduct-code)