Biomedical Engineering 256/Physics 256 – Bioelectricity

Fall 2004

Instructor: John P. Wikswo
Gordon A. Cain University Professor, Professor of Biomedical Engineering, Molecular Physiology and Biophysics, and Physics
Office: 6809 Stevenson Center Office Phone: 322-2977
Class time: To be arranged. Most likely Tuesdays and Thursdays
Office Hours 9:00-10:00 Monday and Wednesday, 2:00-3:00 Friday


Nerve, Muscle and Synapse, B. Katz, McGraw-Hill
Nerve and Muscle: Membranes, Cells and Systems, R.B. Stein, Plenum
Bioelectric Phenomena, R. Plonsey, McGraw-Hill (Out of Print)

Class description: Biomedical Engineering 256/Physics 256 – Bioelectricity. The cellular basis of the electrical activity of nerve and muscle cells; action potential propagation; voltage- and ligand-gated ion channels; space, voltage, and patch clamp; and electrical, optical, and magnetic measurement of bioelectric activity in cells, isolated tissues, intact animals, and humans. FALL [3] Wikswo.

Prerequisites One year of introductory college physics and an understanding of physiology

Format The class will have a mixed lecture/seminar format. Assigned reading must be completed before each class. Formal lectures by the instructor will concentrate on responding to questions students have about the assigned readings, particularly regarding the mathematical aspects of the assigned reading. Students will lead the discussion of assigned reading from the physiological texts and also research articles in a journal club format. Homework exercises will be drawn from Plonsey and Barr. The paper proposal will introduce the topic that will be explored in the final research paper or numerical model, and will provide a detailed bibliography that will form the basis of this project. Students taking the course for graduate credit will be expected to produce their final project in the form of a draft manuscript or NIH proposal.

Grading: 20% Class participation – timely handing in of reading and class one-minute papers that raise or answer points for in-class discussion
10% Presentation/critique of assigned reading (two assignments at 20% each)
30% Homework
10% Mid-term examination/problem
20% Final examination/report/project
10% Presentation of final report/project/solution to the class