

BMED/ECE 4784 Engineering Electrophysiology (Elective)

Catalog Description: BMED 4784 Engr Electrophysiology (3-0-3)
Prerequisite(s): ECE 3040 or BMED 3520
Basic concepts of electrophysiology from an engineering perspective. Functionality of relevant organs and systems; instrumentation tools which monitor electrophysiology function.

Textbook: Bioelectricity: A Quantitative Approach, 3rd edition, Plonsey and Barr, Kluwer Academic/Plenum Publishers (2007)

Prepared by: William Hunt

Topics Covered:

1. Membrane biophysics
2. Action potentials
3. Extracellular fields
4. Cellular analysis technologies
5. Electrophysiology of the heart
6. Skeletal muscle
7. Functional neuromuscular stimulation
8. Interface circuitry/systems
9. Advanced electrophysiological analysis systems

Course outcomes:

Students who complete this course will:

1. Understand basic concepts of electrophysiology (Student Outcome a)
2. Understand analogies between active/passive electrical circuits and electrophysiology (Student Outcome a)
3. Understand the function of organs and systems in the body relevant to electrophysiology (Student Outcome a)
4. Know the tools used to monitor and quantify the electrophysiological properties of biological systems (Student Outcomes a and k)

Correlation between course outcomes and student outcomes:

BMED 4784											
	Biomedical Engineering Student Outcomes										
Course outcomes	a	b	c	d	e	f	g	h	i	j	k
1	X										
2	X										
3	X										
4	X										X

The Wallace H. Coulter Department of Biomedical Engineering Student Outcomes:

- a. an ability to apply knowledge of mathematics, science, and engineering;
- b. an ability to design and conduct experiments, as well as to analyze and interpret data;
- c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, societal, political, ethical, health and safety, manufacturability, and sustainability;
- d. an ability to function on multidisciplinary teams;
- e. an ability to identify, formulate, and solve engineering problems;
- f. an understanding of professional and ethical responsibility;
- g. an ability to communicate effectively;
- h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- i. a recognition of the need for, and an ability to engage in lifelong learning;
- j. a knowledge of contemporary issues;
- k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice;