

BMED/CHBE/ECE/ME 4781 Biomedical Instrumentation (Elective)

Catalog Description: BMED 4781 Biomed Instrumentation (3-0-3)
Prerequisite(s): ECE 3040 or ECE 3710
A study of medical instrumentation from a systems viewpoint. Pertinent physiological and electro-physiological concepts will be covered.

Textbook: Medical Instrumentation: Application and Design, 4th edition, Webster, ed., John Wiley & Sons (2011)

Prepared by: Steve Potter

Topics Covered:

1. Basic Concepts of Instrumentation
2. Membrane Biophysics
3. Action Potentials
4. Biopotential Electrodes
5. Electrophysiology of the Heart
6. Electrophysiology of Neuromuscular System
7. Miscellaneous Electrophysiology
8. Biomedical Transducers
9. Measurement of Blood and Gas Flows

Course outcomes:

Students who complete this course will be able to:

Outcome 1: Classify systems modeling biomedical sensors and instrumentation (Student Outcomes e and k)

Outcome 2: Calculate the static and dynamic characteristics of bioinstrumentation systems (Student Outcomes b, e, and k)

Outcome 3: Design simple analog circuits (e.g. instrumentation amplifiers and active filters) used in bioinstrumentation (Student Outcomes b and k)

Outcome 4: Apply sampling theorem fundamentals to design A/D conversion processes for biomedical signal acquisition (Student Outcomes b and k)

Correlation between course outcomes and student outcomes:

BMED 4781											
	Biomedical Engineering Student Outcomes										
Course outcomes	a	b	c	d	e	f	g	h	i	j	k
1					X						X
2		X			X						X
3		X									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;