BMED 3520 Biomedical Systems and Modeling (Required)

Catalog Description: BMED 3520 Biomed Systems & Model (3-3-4) Prerequisite(s): BMED 2210 (w/min grade of "C)", BMED 3100 and MATH 2552. Basic concepts, modeling tools and analysis techniques for the study of biochemical, bioelectrical and biomedical systems.

Textbook: Physiological Control Systems: Analysis, Simulation, and Estimation, Khoo, Wiley IEEE Press (2000).

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Topics Covered:

1. Systems and modeling
2. Linear systems analysis in the time domain
3. Linear systems analysis in the Laplace domain
4. Linear systems analysis in the frequency domain
5. Control systems design and analysis

Course outcomes:

Students who complete this course will be able to:

Outcome 1: Understand the fundamentals of quantitative physiological modeling (Student Outcomes a and e)

- 1.1 Understand the basic strengths and limitations of quantitative modeling
- 1.2 Understand steady-state and dynamical analysis techniques
- 1.3 Know the relationships between time, Laplace, and frequency domains

Outcome 2: Identify, formulate and solve quantitative models of physiological systems using analytical tools in the time, Laplace, and frequency domains (Student Outcomes a, e, and k)

- 2.1 Understand how to solve biomedical engineering problems using quantitative modeling tools from the time domain
- 2.2 Understand how to solve biomedical engineering problems using quantitative modeling tools from the Laplace domain
- 2.3 Understand how to solve biomedical engineering problems using quantitative modeling tools from the frequency domain

Correlation between course outcomes and student outcomes:

BMED 3520											
	Biomedical Engineering Student Outcomes										
Course outcomes	a	b	c	d	e	f	g	h	i	j	k
1.1	X				X						X
1.2	X				X						X
1.3	X				X						X
2.1	X				X						X
2.2	X				X						X
2.3	X				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;