BMED 3100 Systems Physiology (Required)

Catalog Description: Systems Physiology (3-0-3)
Prerequisite(s): CHEM 1315 (w/ minimum grade of "C") OR CHEM 2311 OR Junior Standing
An introduction to human physiology emphasizing biomedical engineering approaches to the understanding of basic organ function, disease states, and medical intervention.

Textbook: Human Physiology: An Integrated Approach, 6th edition, Silverthorn, Prentice-Hall (2013)

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Topics Covered:

1. Tissues of the body
2. Homeostasis
3. Physiological control systems
4. Introduction to pathophysiology
5. Cell membranes and transports, diffusion, osmosis, and tonicity
6. Multiple physiological systems
7. Selected topics and case studies in integrative physiology, pathophysiology, and biomedical engineering applications

Course outcomes:

Students who complete this course will be able to:

Outcome 1: Understand basic terminology, structures, and processes in human physiology (Student Outcomes a and g)

- 1.1 State the anatomical structures and physiological functions of major organ systems
- 1.2 Understand homeostatic processes and integration of human organ systems
- 1.3 Explain medical terminology as it relates to physiology, pathophysiology, and biomedical engineering

Outcome 2: Apply quantitative approaches for the analysis of physiological systems (Student Outcomes a and i)

- 2.1 Apply quantitative skills for analyzing physiological processes in both normal and disturbed states
- 2.2 Simplify and model physiologic processes

Outcome 3: Identify, analyze and interpret data from physiological systems (Student Outcomes a, b and j)

- 3.1 Consider patient variability and its impact on biomedical engineering challenges
- 3.2 Analyze and interpret data from medical case studies

Outcome 4: Tackle complex real world human physiological problems (Student Outcomes a, b, f and g)

- 4.1 Understand the challenges associated with interaction between non-living materials and living systems

4.2 Read and critique the scientific/medical literature
4.3 Identify and discuss ethical issues associated with medical intervention and modern engineering tools and applications

Correlation between course outcomes and student outcomes:

BMED 3100											
	Biomedical Engineering Student Outcomes										
Course outcomes	a	b	c	d	e	f	g	h	i	j	k
1.1	X										
1.2	X										
1.3							X				
2.1	X								X		
2.2	X								X		
3.1	X	X								X	
3.2	X	X								X	
4.1	X										
4.2		X					X				
4.3						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 life-long learning;
j. a knowledge of contemporary issues;
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice;