

BMED 3610 Quantitative Engineering Physiology Laboratory II (Required)

Catalog Description: BMED 3610 Quant Engr Physio Lab II (1-3-2) Prerequisite(s): BMED 2400 or ISYE 3770 and BMED 3600 (w/ concurrency)

BMED 3610 course provides a problem-based project driven active learning in a team environment where students propose research strategies to tackle biomedical problems such as cancer allowing them to reinforce selected engineering principles and perform hands-on experimentation to validate their hypothesis using appropriate model cell culture systems.

Textbook: None

Prepared by: S. Balakrishna Pai

Topics Covered:

1. In vitro cell culture
2. Microscopy and image analysis
3. Reading and analysis of peer-reviewed scientific literature
4. Reproduction of experimental results published in the literature
5. Design/engineer experimental strategies to tackle a specific biomedical problem
6. Perform hands-on experimentation of independent, open-ended hypothesis-driven projects using appropriate techniques and technologies.

Course outcomes: Students who complete this course will be able to:

Outcome 1: Conduct experiments as well as to measure, analyze, and interpret experiment data from cells and cellular systems (Student Outcome b)

Outcome 2: Understand homeostasis in cellular systems and be able to apply this information to bioreactor design problems (Student Outcomes a, e, and k)

Outcome 3: Understand the impact of the variability of biological systems at the cellular level on engineering design (Student Outcomes a, e)

Outcome 4: Address challenges associated with the interaction of inhibitory agents on cellular circuits (Student Outcome b)

Outcome 5: Design and conduct an experimental design project, and present the results (Student Outcomes b, g, and k)

Correlation between course outcomes and student outcomes:

BMED 3610: Biomedical Engineering Student Outcomes Course outcomes

Course Outcomes	a	b	c	d	e	f	g	h	i	j	k
1		X									
2	X			X							X
3	X			X							
4		X									
5		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;