BME 383 – Measurement Lab for Physiological Systems and Tissue

3 Credits, 5 Contact hours
Instructor: Bruno Mantilla, Ph.D.

Textbook(s)/Materials Required:
Fundamentals of Human Physiology, 4th Edition Lauralee Sherwood - West Virginia University
ISBN-10: 0840062257   ISBN-13: 9780840062253, 720 Pages Paperback   ©2012 Published
Matlab , An Introduction with Applications. Amos Gilat. Publisher: Wiley and sons. 2 edition 2007

Description:
This course is intended for students to integrate their basic knowledge of physiology, biology, engineering, and math. By the end of the semester students should be able to implement their engineering and analytical skills in order to record signals, make measurements, and develop solutions when faced with challenging situations in the biomedical field.

Prerequisites: BME 105, BME 106 (Physiology), BME 310 (Biomedical Computing)

Outcomes:
By the end of the semester the student should be able to apply engineering tools and knowledge to decipher, understand and describe situations and problems originated in living systems.

Outcome # 1. Students will learn to evaluate a proposed experiment.		
Strategies & Actions	**Program Outcomes**	**Assessment Methods**
Students will be able to identify the experimental problem in engineering terms, and then state the problem in a hypothesis	B	Lab report. Class discussions. Quizzes
Outcome # 2. Students will learn to critically review experimental design.		
Strategies & Actions	**Program Outcomes**	**Assessment Methods**
During the discussion sessions the students will evaluate and criticize the adopted strategies used for sensing, recording, and analyzing data collected during previous session.	K, L	Lab report. Class discussions. Quizzes
Outcome # 3. Students will learn to create and propose solutions		
Strategies & Actions	**Program Outcomes**	**Assessment Methods**
In their lab reports, as well as in the introductory and discussion sessions,	L, N	Lab report. Class discussions. Quizzes

students are encouraged to propose new techniques for performing the projected studies, and new means for achieving the desired results.		

Outcome # 4. Students will enhance creativity		
Strategies & Actions	**Program Outcomes**	**Assessment Methods**
Missing sections of directions and methods, explicitly identified, will be included in the lab. guides. Students will be forced to identify and fulfill the missing portions.	B, N	Lab report. Class discussions. Quizzes
Outcome # 5 Students will learn to select and use modern engineering tools.		
Students will discuss the different engineering tools and techniques (software and hardware) used in each assignment.	B,K,L,N	Lab report. Class discussions. Quizzes
Outcome # 6. Students will understand the importance of existing research and product-development opportunities in different areas in biomedical engineering .		
Strategies & Actions	**Program Outcomes**	**Assessment Methods**
Discussions and clinical examples, with direct relation to engineering opportunities and contribution to therapy are introduced during the class discussions, as well as experimental set-ups mimicking altered function in pathological conditions	I	Lab report. Class discussions. Quizzes

ABET Outcomes expected of graduates of BME BS program by the time that they graduate:

(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, social, political, ethical, health and safety, manufacturability, and sustainability

(D) an ability to function on multi-disciplinary 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.

(L) an understanding of biology and physiology

(M) the capability to apply advanced mathematics (including differential equations and statistics), science, and engineering to solve problems at the interface of engineering and biology

(N) an ability to make measurements on and interpret data from living systems

(O) an ability to address problems associated with the interaction between living and non-living materials and systems.