BIOMEDICAL SENSING INSTRUMENTATION

EBME 480C

COURSE DESCRIPTION: Study of principles, applications, and design of biomedical instruments with special emphasis on transducers. Understanding of basic sensors, amplifiers, and signal processing. Discussion of the origin of biopotential, and biopotential electrodes and amplifiers (including biotelemetry). Understanding of chemical sensors and clinical laboratory instrumentation, including microfluidics. (3 credit hours)

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TEXTBOOKS:
Medical Instrumentation (Application and Design) by Webster (Wiley, 4th ed.)

PREREQUISITES: 480A, 480B

COURSE OBJECTIVES: This course is designed to provide the students with a basic understanding of biomedical instrumentation with emphasis on transducers.

COURSE GRADE:
Quizzes (30%): ~ biweekly
Homework (40%): 4 assignments, ~ biweekly
Project (30%): Design, build and demonstrate a Biomedical sensing device/instrument to be used in cardiology.

COURSE SCHEDULE:
WK 1 Ch 1: Basic concepts of medical instrumentation
WK 2 Ch 2: Basic sensors and principles
WK 3 Ch 2: Basic sensors and principles
WK 4 Ch 3: Amplifiers and signal processing
WK 5 Ch 3: Amplifiers and signal processing
WK 6 Ch 4: The origin of biopotentials
WK 7 Ch 4: The origin of biopotentials
WK 7 Ch 14: Electrical Safety; Workshop on Fundamentals of Design
WK 8 Ch 5: Biopotential electrodes
WK 9 Ch 5: Biopotential electrodes
WK 10 Ch 6: Biopotential amplifiers
WK 11 Ch 6: Biopotential amplifiers
Ch 10: Chemical biosensors *(extra lecture)*
WK 12 Ch 10: Chemical biosensors
WK 13 Ch 11: Clinical laboratory instrumentation
WK 14 Ch 11: Clinical laboratory instrumentation
WK 15 Project Presentations

University Student Ethics Policy
http://studentaffairs.case.edu/ai/policy.html
Violations of the Student Ethics Policy will result in failure in the assignment in question or the course, or referral to the academic integrity board as per university policy.
All forms of academic dishonesty including cheating, plagiarism, misrepresentation, and obstruction are violations of academic integrity standards. Cheating includes copying from another's work, falsifying problem solutions or laboratory reports, or using unauthorized sources, notes or computer programs. Plagiarism includes the presentation, without proper attribution, of another's words or ideas from printed or electronic sources. It is also plagiarism to submit, without the instructor's consent, an assignment in one class previously submitted in another. Misrepresentation includes forgery of official academic documents, the presentation of altered or falsified documents or testimony to a university office or official, taking an exam for another student, or lying about personal circumstances to postpone tests or assignments. Obstruction occurs when a student engages in unreasonable conduct that interferes with another's ability to conduct scholarly activity. Destroying a student's computer file, stealing a student's notebook, and stealing a book on reserve in the library are examples of obstruction.

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