UNIVERSITY OF MANITOBA | Electrical and Computer Engineering

ECE 4610 BIOMEDICAL INSTRUMENTATION AND SIGNAL PROCESSING
COURSE OUTLINE - FALL 2009

Course Objectives

The goal is to introduce biological systems and apply engineering principles (electrical and mechanical) to the solution of the biomedical problems. The emphasis of this course will be both practical and theoretical. You will design systems to acquire biomedical signals in the laboratory and use this data throughout the course.

Contact hours

3 lecture hours per week, 3 laboratory hours every 2nd week; 4 credit hours

Prerequisites

ECE 3780

Course content

The following topics will be covered:

1. Special problems and requirements for recording and analyzing biological signals, i.e. EEG, EMG, from human subjects.
2. The design of instrumentation amplifiers for analog signal conditioning.
3. Examination of possible health hazards associated with measurement of biological signals.
4. Study of relevant physiology and anatomy of the physiological systems.
5. Analysis of biological signals.

Textbook

There is no mandatory textbook for this course.

Recommended References

1. Lecture notes, which will be available on the course web page and will provide the necessary physiology and anatomy, as well as signal analysis background.
2. *Medical Instrumentation: Application and Design*, 3rd Edition, by John G. Webster, Wiley. Specifically, the course will cover material from chapters 1, 3, 5, and 6, and some sections of chapters 7, 8, 9, and 14.

Recommended Software

Lab View will be used for data acquisition in the labs. Students may find it beneficial to purchase the student edition of Lab View.

Evaluation

The final course grade is determined by the student's performance on the following:

Component	Value	Details
Quizzes	25%	
Lab Experiments & Assignments	20%	
Project (1)	25%	
Final Examination	30%	

Web Page

http://mac-biomedsrv.ee.umanitoba.ca/ECE4610

Voluntary Withdrawal Date

Wednesday, November 18th, 2009.

Instructor

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Office Hours

By appointment

Teaching Assistant

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Requirements/Regulations

- Attendance at lectures and laboratories is essential for successful completion of this course. Students must satisfy each evaluation component in the course to receive a final grade.
- It is the responsibility of each student to contact the instructor *in a timely manner* if he or she is uncertain about his or her standing in the course and about his or her potential for receiving a failing grade. Students should also familiarize themselves with Sections 4 and 6 of the Regulations dealing with incomplete term work, deferred examinations, attendance and withdrawal.
- No programmable calculators, PDA's, iPods, cell phones, wireless communication or data storage devices, etc., are allowed in examinations unless approved by the course instructor.

Academic Integrity

Students are expected to conduct themselves in accordance with the highest ethical standards of the Profession of Engineering and evince academic integrity in all their pursuits and activities at the university. As such, in accordance with the General Academic Regulations and Requirements of the University of Manitoba, Section 7.1, students are reminded that plagiarism or any other form of cheating in examinations, assignments, laboratory reports or term tests is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university). A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty.