Carleton University

Department of Systems and Computer Engineering

BIOM 5100 / SYSC 5302 Bioinstrumentation Winter 2012

Instructor:
Prof. A. Marble
Office 6202 Canal Building
Phone: 613-520-2600 Ext. 2963
e-mail amarble@sce.carleton.ca

WWW: Course material will be posted on a course website, available through www.sce.carleton.ca/faculty/marble/teaching.html

Description:
Instrumentation designed to measure physiological variables related to the function of the heart, lungs, kidneys, nervous and musculo-skeletal system; emergency, critical care, surgery and anesthesia equipment.

Times and Locations:
Monday/Wednesday, 1:00 PM – 2:30 PM, Room ME 3356.

Course Textbook:

John G. Webster, ed., Medical Instrumentation: Application and Design, 4th ed. ISBN 978-0-471-67600-3

It is strongly recommended that all students have access to the textbook.

Prerequisites:
Course is open to OCIECE and OCIBME graduate students.

Grading:
Assignments: 20%; Midterm: 10%
Final Exam: 35%; Project: 35%

Assignments:

There will be ~**four** assignments. Assignments will be posted on the course website.

Project:

An in-depth research project must be completed in the broad area of biomedical instrumentation. The project can consist of designing and performing a medical instrumentation experiment, implementing and testing a medical instrumentation algorithm, or an in depth study of a medical instrumentation application. The project is worth 35% of the final grade, and deserves an amount of effort in keeping with this weight. The project consists of the following components:

1. Proposal **Due Jan 23**: 1-2 pages, include problem description, proposed plan and references.
2. Midterm Report **Due Feb 27**: Describe the project progress to date and any challenges encountered.

3. Presentation **Around the 2nd last day of classes** A ~10 minute presentation followed by a question period.

4. Project report. The bulk of your mark will be based on the report. This should be written like a journal article; the exact format will depend on the type of project you have undertaken. For example, experimental work would probably be written up with an introduction, experimental, results, discussion type structure, while an in depth review of a particular topic would be structured differently. Please see the course instructor if there is any confusion about the report structure. The number of pages is irrelevant.

Examinations:
There will be one in class midterm, worth 10%, held on Feb. 15. Any date changes will be mentioned in class and posted on the website. Midterm attendance is **required**. Students who miss the midterm exam due to illness are required to provide a doctor's note to their instructor within 48 hours of returning to campus, and in this case the midterm exam weight will be shifted to the final exam. Other excuses for missing the midterm exam will not be accepted and a grade of zero will be assigned.

The final examination will be held (tentatively) on the last day of classes. This will be a 3-hour written exam. Details will be discussed in class.

The final examination is for evaluation purposes only and will not be returned to students.

Both exams (midterm and final) will be closed-book but students **will be allowed to prepare and bring with them one 8.5"x11" crib sheet, both sides, to each exam, along with a calculator**.

Students with Disabilities:
Students with disabilities who require academic accommodations in this course are encouraged to contact the Paul Menton Centre (PMC) to complete the necessary *letters of accommodation*. After registering with the PMC, make an appointment with the instructor to discuss your specific needs at least two weeks prior to the first in-term test.

Plagiarism:
Plagiarism (copying and handing in for credit someone else's work) is a serious instructional offense that will not be tolerated. Please refer to the section on instructional offenses in the Undergraduate Calendar for additional information.

Outline (each topic will take 0.5-2 weeks)

0. Introduction
1. Bioelectric Signals (Ch. 4)
2. Electrodes (Ch. 5)
3. Amplifiers and Biopotential Amplification (Ch. 3 and Ch. 5)
4. Blood Pressure and Sound (Ch. 7)
5. Blood Flow (Ch. 8)
6. Respiratory System (Ch. 9)
7. Safety (Ch. 14)
8. Other topics time permitting, maybe something MRI related like MRI of physiological processes?

NOTE: The above plan is tentative and subject to change. Students will be notified of changes in class and the course website.

Health and Safety:
Every student should have a copy of our Health and Safety Manual. An electronic version of the manual can be found at http://www.sce.carleton.ca/courses/health-and-safety.pdf