# Department of Electrical and Computer Engineering

## COURSE OUTLINE

## BME 335 – Biosensors and Instrumentation

**Term – Fall 2014 (201409)**


**Instructor**

Poman So, Ph.D., P.Eng.
Phone: 250-472-4224
E-mail: Poman.So@UVic.CA


**Office Hours**

Days: Tue & Wed
Time: 10:00 – 11:00
Location: EOW 417

**Lectures**

**A**-Section(s): A01 / CRN 10372
Days: Tue, Wed & Fri
Time: 8:30 – 9:20
Location: HHB 116

**Labs** **Location: ELW A321**

| **B**-Section(s) | Days | Time |
|---|---|---|
| B01: 10373 | Closed | |
| B02: 10374 | Tue | 14:30 – 17:20 |

**Required Text**

Title: Medical Instrumentation Application and Design, 4ed, ISBN 978-0-471-67600-3
Author: Webster
Publisher: Wiley
Year: 2009

**References**

Title: Introduction to Biomedical Engineering, 3ed, ISBN 978-0-12-374979-6
Author: John D. Enderle, Joseph D. Bronzino
Publisher: Elsevier / Academic Press
Year: 2012

**Assessment**

| | |
|---|---|
| Assignments: | 10% |
| Labs*[1] | 20% |
| Mid-term*[2] | 20% |
| Final*[2&3] | 50% |

Date: **Tue 14 October 2014**

***Note**

1. Failure to complete all laboratory requirements will result in a grade of N being awarded for the course.
2. Must attend all labs and at least 80% of the lectures in order to qualify to write the midterm and final examinations (http://web.uvic.ca/calendar2014/FACS/UnIn/UARe/Atte.html)
3. Failure to pass the final examination will result in a grade of **F** being awarded for the course.
4. Plagiarism detection software may be used to aid the instructor and/or TA's in the review and grading of some or all of the work you submit (http://library.uvic.ca/instruction/cite/plagiarism.html).

**Due Dates for Assignments and Lab Reports**

- T.B.A.

**Lab Requirements**

- Lab begins on Monday, 22 September 2014.

- See GENERAL LABORATORY REGULATIONS FOR STUDENTS in the lab manual for details about report requirements.

**Final Grade**

The final grade obtained from the above marking scheme will be based on the following percentage-to-grade point conversion:

| | Grades | Grade Point Value | Percentage for Instructor Use Only | Note |
|---|---|---|---|---|
| Passing | A+<br>A<br>A– | 9<br>8<br>7 | 90 – 100<br>85 – 89<br>80 – 84 | |
| | B+<br>B<br>B– | 6<br>5<br>4 | 77 – 79<br>73 – 76<br>70 – 72 | |
| | C+<br>C | 3<br>2 | 65 – 69<br>60 – 64 | |
| | D | 1 | 50 – 59 | |
| Failing | E | 0 | 0 – 49 | Fail, conditional supplemental exam*.<br>(For undergraduate courses only) |
| | F | 0 | 0 – 49 | Fail, no supplemental. |
| | N | 0 | 0 – 49 | Did not write examination, lab or otherwise completed course requirements by the end of the term or session; no supplemental exam. |

* Assignment of E grade will be at the discretion of the Course Instructor.
The rules for supplemental examinations are found on page 80 of the current 2014/15 Undergraduate Calendar.

| Term in which E Grade was obtained: | Application Deadline for Supplemental Exam | Supplemental Exam Date |
|---|---|---|
| First term of Winter Session (Sept – Dec) | February 28 in the following term | First week of following May |
| Second term of Winter Session (Jan – Apr) | June 30 in the following term | First week of following September |
| Summer Session (May – Aug) | October 31 in the following term | First week of following January |

Deferred exams will normally be written at the start of the student's next academic term; i.e., approximately 4 months following the deferral of the exam.

**Course Description**

1. **Course Objectives:** An introduction to and overview of the field of biomedical sensors and instrumentation.
2. **Learning Outcomes:** Upon completion of this course students should be able to:
   a. Define and discuss the role of biomedical engineering in today's health care industry especially in the domain of sensors and instrumentation.
   b. Describe various types of bio-signals and their physiological origins.
   c. Outline and categorize major components of medical instruments.
   d. Explain the electronic circuits and devices used in biomedical equipment.
   e. Explain, compare and evaluate sensors, transducers, and electrodes.
   f. Explain depolarization and repolarization of the heart.
   g. Interpret ECG signals and design ECG signal processing circuits.
   h. Describe the evoked potentials in EEG and EMG. Describe EEG and EMG electrodes.
   i. Explain ultrasound propagation and compare various ultrasound imaging modes.
   j. Describe electromagnetic imagining technologies such as x-ray, CT, and MRI.

3. **Syllabus:** A study of the basic principles of biomedical electronics and measurement with emphasis on instruments and systems for biomedical data acquisition and processing. Topics will include electrocardiography (ECG), electroencephalography (EEG), medical ultrasound, magnetic resonance imaging (MRI), and x-ray computed tomography (CT).

**Note to Students**

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the ECE Chair by email or the ECE Chair's Secretary eceasst@uvic.ca to set up an appointment.

**Accommodation of Religious Observance**

See http://web.uvic.ca/calendar2014/GI/GUPo.html

**Policy on Inclusivity and Diversity**

See http://web.uvic.ca/calendar2014/GI/GUPo.html

**Standards of Professional Behaviour**

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour at http://www.uvic.ca/engineering/current/undergrad/index.php#section0-25 which contains important information regarding conduct in courses, labs, and in the general use of facilities.

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult http://web.uvic.ca/calendar2014/FACS/UnIn/UARe/PoAcI.html for the UVic policy on academic integrity.

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