## FACULTY COURSE ASSESSMENT REPORT

## **Department of Biomedical Engineering**

<u>Academic Year</u>: 2012-2013 <u>Term</u>: Winter 2013

Course Code and Title: BME140, Design of Biomedical Electronics

## Instructor: Mahsa Rouhanizadeh, PhD

Background: Please review the ABET background document.

**Instructions**: For each student outcome performance indicator, identify (1) the <u>assignment</u> (which quiz, quiz problem, exam problem, or project) was used to assess that indicator, (2) the <u>maximum</u> score possible on that assignment, (3) the performance <u>standard</u> for that assignment expressed in points and also as a percentage of max, (4) the number of <u>students</u> who were assessed on that assignment, (5) the <u>average</u> score achieved by them expressed in points and percentage of max, and (6) the number and percentage of BME students who <u>achieved</u> the performance standard.

**Performance Indicators (PIs)**: This course assesses the following Performance Indicators (please consult the *Proposed Remapping of BME courses to Student Outcomes* document): **a3, b1, b2, b3, k1, k2.** 

a3 — Students can apply knowledge of engineering to problems in Biomedical Engineering.

- b1 Students can design biomedically relevant experiments.
- b2 Students can conduct biomedically relevant experiments.
- b3 Students can analyze and interpret data from biomedically relevant experiments (including living systems).
- k1 Students can collect data from biomedical systems.
- k2 Use software tools to model biomedical systems, and analyze and interpret biomedical data.

PIs	Assignment used for assessment	Max. score	PI standard and % of maximum	Number of students tested	Average score and % of maximum	Number and % of BME students who met the standard
(a3)	HW1 (all)	10	6 (60%)	101	7.92 (79.2%)	86(87.13%)
	HW9 (all)	10	6 (60%)	101	8.70 (87.0%)	93 (94.06%)
	LR3 (all)	10	6 (60%)	101	8.3 (83.0%)	90(91.09%)
	LR6 (all)	10	6 (60%)	101	9.77 (97.7%)	98 (99.01%)
	Midterm (all)	100	60 (60%)	101	60.25 (60.25%)	52 (52.48%)
	Final (all)	100	60(60%)	99	71.71(71.71%)	78 (79.21%)
	Average:				79.81(%)	82 (83.83%)
(b1)	HW3 (all)	10	6 (60%)	101	7.36 (73.6%)	76 (77.23%)
	HW4 (all)	10	6 (60%)	101	4.20 (42.0%)	17 (17.82%)
	HW5 (all)	10	6 (60%)	101	9.08 (90.8%)	86 (87.13%)
	HW6 (all)	10	6 (60%)	101	8.26 (82.6%)	90 (91.09%)
	HW7 (all)	10	6 (60%)	101	8.99 (89.9%)	97 (98.02 %)
	HW8 (all)	10	6 (60%)	101	9.41 (94.1%)	96 (97.03%)
	HW9 (all)	10	6 (60%)	101	8.70 (87.0%)	93 (94.06%)
	Midterm (all)	100	60 (60%)	101	60.25 (60.25%)	51 (52.48%)
	Final (all)	100	60 (60%)	99	71.71 (71.71%)	78 (79.21%)
	Average:				76.8%	76 (77.00%)

(b2)	LR5 (all)	10	6 (60%)	101	8.86 (88.6%)	96 (97.03%)
	LR6 (all)	10	6 (60%)	101	9.77 (97.7%)	98 (99.01%)
	Average:				(93.15%)	97 (98.02%)
(b3)	LR5 (all)	10	6 (60%)	101	8.86 (88.6%)	96 (97.03%)
	LR6 (all)	10	6 (60%)	101	9.77 (97.7%)	98 (99.01%)
	Average:				(93.15%)	97 (98.02%)
(k1)	LR5 (all)	10	6 (60%)	101	8.86 (88.6%)	96 (97.03%)
	LR6 (all)	10	6 (60%)	101	9.77 (97.7%)	98 (99.01%)
	Average:				(93.15%)	97 (98.02%)
(k2)	LR5 (all)	10	6 (60%)	101	8.86 (88.6%)	96 (97.03%)
	LR6 (all)	10	6 (60%)	101	9.77 (97.7%)	98 (99.01%)
	Average:				(93.15%)	97 (98.02%)

<u>Course Learning Outcomes</u>: This course assesses the following Course Learning Outcomes (please consult your *Course Outline* document):

**CLO1**: Students will be able to understand the nature of common biomedical signals (a,k).

**CLO2**: Students will be able to apply the essential techniques for analyzing analog and digital biomedical signals (**a**,**k**). **CLO3**: Students will be able to analyze linear time invariant systems (**a**,**k**).

**CLO4**: Students will be able to develop computing skills by using MATLAB for signal analysis and system modeling (k).

CLOs	Assignment used for assessment	Performance standard	Number of students tested	Average score (%)	Number and % of BME students who met the standard
1	HW#1-9,Midterm,Final Exam	66.67%	101	79.6%	77 (78.21%)
2	HW#1-9,Midterm,Final Exam	66.67%	101	79.6%	77 (78.21%)
3	HW#1-9,Midterm,Final Exam	66.67%	101	79.6%	77 (78.21%)
4	HW#7	66.67%	101	89.9%	97(98.02%)

What changes did you make in this course based on previous assessment results?

Solved more examples in the class which were related to the homework and exams. Posted my lecture notes as supplementary material online to help better the student follow up the examples.

What recommendations do you have for improving the course the next time it is taught?

Add more biomedical applications to the course especially in the homework (like practical projects). If the basic of electrical engineering is taught in a prerequisite course, then this course can focus more on the biomedical application and real design.

What recommendations do you have, if any, regarding prerequisite courses or other ways to improve student preparation for this course?

A prerequisite course with emphasize on electronic components (diode, transistors, capacitors, ....) and the physics behind them will be beneficial for the students in this course.

Any other recommendations or comments?

No