

FACULTY COURSE ASSESSMENT REPORT

Department of Biomedical Engineering

Academic Year: 2011-2012

Term: Winter 2012

Course Code and Title: **BME140 Design of Biomedical Electronics**

Instructor: Zhongping Chen, PhD

Background: Please review the *ABET background* document.

Instructions: For each student outcome performance indicator, identify (1) the assignment (which quiz, quiz problem, exam problem, or project) was used to assess that indicator, (2) the maximum score possible on that assignment, (3) the performance standard for that assignment expressed in points and also as a percentage of max, (4) the number of students who were assessed on that assignment, (5) the average score achieved by them expressed in points and percentage of max, and (6) the number and percentage of BME students who achieved 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%)	72	8.53 (85.3%)	65 (90.3%)
	HW9 (all)	10	6 (60%)	72	8.94 (89.4%)	70 (97.2%)
	LR3 (all)	10	6 (60%)	72	8.88 (88.8%)	68 (94.4%)
	LR6 (all)	10	6 (60%)	72	9.56 (95.6%)	71 (98.6%)
	Midterm (1)	13	7.8 (60%)	72	12.3 (94.6%)	70 (97.2%)
	Final (2)	20	12 (60%)	72	15.47 (77.4%)	62 (86.1%)
	Average:				(88.5%)	67.7 (94.0%)
(b1)	HW3 (all)	10	6 (60%)	72	8.78 (87.8%)	68 (94.4%)
	HW4 (all)	10	6 (60%)	72	7.75 (77.5%)	56 (77.8%)
	HW5 (all)	10	6 (60%)	72	9.03 (90.3%)	69 (95.8%)
	HW6 (all)	10	6 (60%)	72	8.64 (86.4%)	65 (90.3%)
	HW7 (all)	10	6 (60%)	72	9.01 (90.1%)	72 (100 %)
	HW8 (all)	10	6 (60%)	72	8.72 (87.2%)	69 (95.8%)
	HW9 (all)	10	6 (60%)	72	8.94 (89.4%)	70 (97.2%)
	Midterm (3)	30	18 (60%)	72	26.96 (89.86%)	69 (95.8%)
	Midterm (4)	30	18 (60%)	72	25.10 (83.66%)	68 (94.4%)
	Final (4)	20	12 (60%)	72	12.87 (64.36%)	42 (59.7%)
	Average:				(84.7%)	64.8 (90.1%)

(b2)	LR5 (all)	20	12 (60%)	72	18.49 (92.5%)	72 (100%)
	LR6 (all)	10	6 (60%)	72	9.56 (95.6%)	71 (98.6%)
	Average:				(94.1%)	71.5 (99.3%)
(b3)	LR5 (all)	20	12 (60%)	72	18.49 (92.5%)	72 (100%)
	LR6 (all)	10	6 (60%)	72	9.56 (95.6%)	71 (98.6%)
	Average:				(94.1%)	71.5 (99.3%)
(k1)	LR5 (all)	20	12 (60%)	72	18.49 (92.5%)	72 (100%)
	LR6 (all)	10	6 (60%)	72	9.56 (95.6%)	71 (98.6%)
	Average:				(94.1%)	71.5 (99.3%)
(k2)	LR5 (all)	20	12 (60%)	72	18.49 (92.5%)	72 (100%)
	LR6 (all)	10	6 (60%)	72	9.56 (95.6%)	71 (98.6%)
	Average:				(94.1%)	71.5 (99.3%)

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

CLO1: Analyze DC and AC circuits that consist of resistors and capacitors. **(a)**

CLO2: Design and construct low pass, high pass, and band pass filters. **(a)**

CLO3: Design and construct amplifier with operational amplifier. **(a)**

CLO4: Use electrical measurement instruments such as multimeter, function generator, oscilloscope, and Labview ELVIS stations to acquire measurement data. **(a,k)**

CLO5: Understand the origin and characteristics of bioelectrical signal, including resting potential and action potential. **(a)**

CLO6: Understand heart electrical circuit and ECG signal. **(a)**

CLO7: Design and construct ECG instruments. **(a)**

CLO8: Describe the safety issues involved in bioelectrical measurement and medical instrumentation.

CLO9: Measure and analyze ECG signals. **(b)**

CLOs	Assignment used for assessment	Performance standard	Number of students tested	Average score (%)	Number and % of BME students who met the standard
1	HW#1-6,8,9, LR#1,3,4,5, Midterm(2-5), Final(3,4)	60%	72	84.3%	65.2 (90.6%)
2	HW#3,5,6, LR#4,5, Final (3-4)	60%	72	83.3%	63.7 (88.5%)
3	HW#3-6, LR#3-5, Midterm(2,3), Final(4,5)	60%	72	82.7%	62.9 (87.3%)
4	LR#1,3-6	60%	72	90.7%	71.0 (98.6%)
5	HW#7,8, LR#6, Final(1,2)	60%	72	85.0%	67.8 (94.2%)
6	HW#7-9, LR#6, Final(2)	60%	72	87.9%	68.8 (95.5%)
7	HW#4-6,9, LR#5,6, Final(4)	60%	72	85.2%	63.7 (88.5%)
8	HW#9, LR#6, Final(2)	60%	72	87.5%	67.7 (94.0%)
9	HW#8, LR#6, Final(2)	60%	72	86.7%	67.3 (93.5%)

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

Provide better training of TA for the laboratory excises before the quarter start

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

Class room is too small to accommodate 78 students. Microphone system is essential for large class. The petition to the change of the class room was granted several weeks after the class started. Several stations in the lab have three persons, which is not most effective for student learning. The laboratory is design for 36 students per session, and two sessions can only accommodate 72 students. Running three sessions should be an option if the class is over 72.

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

All transfer students should take pre-requisite class of BME 130 and EE70.

Any other recommendations or comments?