## FACULTY COURSE ASSESSMENT REPORT

## **Department of Biomedical Engineering**

<u>Academic Year</u>: 2011-2012 <u>Term</u>: Fall 2011

Course Code and Title: BME110A Biomechanics I

## Instructor: Elliot Botvinick, 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): **a1, a3.** 

a1 — Students can apply knowledge of mathematics to problems in Biomedical Engineering

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

| Pls  | Assignment      | Max.  | PI standard    | Number         | Average score  | Number and %      |
|------|-----------------|-------|----------------|----------------|----------------|-------------------|
|      | used for        | score | and % of       | 0T<br>students | and % of       | of BIVIE students |
|      | assessment      |       | maximum        | students       | maximum        | who met the       |
|      |                 |       |                | lested         |                | stanuaru          |
| (a1) | Homework 1      | 20    | 13.33 (66.67%) | 80             | 14.88 (74.38%) | 53 (66.25%)       |
|      | Design Report 1 | 100   | 66.67 (66.67%) | 80             | 82.88 (82.88%) | 76 (95.00%)       |
|      | Homework 2      | 20    | 13.33 (66.67%) | 80             | 14.76 (73.78%) | 62 (77.50%)       |
|      | Homework 3      | 20    | 13.33 (66.67%) | 80             | 14.74 (73.72%) | 63 (78.75%)       |
|      | Midterm 1       | 65    | 43.33 (66.67%) | 80             | 48.21 (74.17%) | 60 (75.00%)       |
|      | Design Report 2 | 100   | 66.67 (66.67%) | 80             | 95.58 (95.58%) | 80 (100.00%)      |
|      | Homework 4      | 20    | 13.33 (66.67%) | 80             | 15.96 (79.78%) | 71 (88.75%)       |
|      | Midterm 2       | 100   | 66.67 (66.67%) | 80             | 69.97 (69.97%) | 44 (55.00%)       |
|      | Homework 5      | 20    | 13.33 (66.67%) | 80             | 19.10 (95.50%) | 78 (97.50%)       |
|      | Final Exam      | 100   | 66.67 (66.67%) | 80             | 79.15 (79.15%) | 68 (85.00%)       |
|      | Design Report 3 | 100   | 66.67 (66.67%) | 80             | 86.88 (86.88%) | 76 (95.00%)       |
|      | Average:        |       |                |                | (80.52%)       | 66.45 (80.07%)    |
| (a3) | Homework 1      | 20    | 13.33 (66.67%) | 80             | 14.88 (74.38%) | 53 (66.25%)       |
|      | Design Report 1 | 100   | 66.67 (66.67%) | 80             | 82.88 (82.88%) | 76 (95.00%)       |
|      | Homework 2      | 20    | 13.33 (66.67%) | 80             | 14.76 (73.78%) | 62 (77.50%)       |
|      | Homework 3      | 20    | 13.33 (66.67%) | 80             | 14.74 (73.72%) | 63 (78.75%)       |
|      | Midterm 1       | 65    | 43.33 (66.67%) | 80             | 48.21 (74.17%) | 60 (75.00%)       |
|      | Design Report 2 | 100   | 66.67 (66.67%) | 80             | 95.58 (95.58%) | 80 (100.00%)      |
|      | Homework 4      | 20    | 13.33 (66.67%) | 80             | 15.96 (79.78%) | 71 (88.75%)       |
|      | Midterm 2       | 100   | 66.67 (66.67%) | 80             | 69.97 (69.97%) | 44 (55.00%)       |
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|-----------------|-----|----------------|----|----------------|----------------|
| Average:        |     |                |    | (80.52%)       | 66.45 (80.07%) |

<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 add, multiple forces and compute moments (EAC a)

CLO2: Students will be able to determine internal forces in a structure.(EAC a)

**CLO3:** Students will be able to design experiments involving single molecule statics (EAC a)

**CLO4:** Students will be able to compute forces within anatomical joints (EAC a)

| CLOs | Assignment used for assessment | Performance<br>standard | Number<br>of<br>students<br>tested | Average<br>score (%) | Number and %<br>of BME students<br>who met the<br>standard |
|------|--------------------------------|-------------------------|------------------------------------|----------------------|--|
| 1    | All                            | 66.67%                  | 80                                 | 80.52%               | 66.45 (80.07%)   |
| 2    | All                            | 66.67%                  | 80                                 | 80.52%               | 66.45 (80.07%)   |
| 3    | Design Project 3               | 66.67%                  | 80                                 | 86.88%               | 76 (95.00%)  |
| 4    | HW#5                           | 66.67%                  | 80                                 | 19.10%               | 78 (97.50%)  |

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

Added the design component. The students responded positively. I added homework problems in which students analyze raw data from a single molecule biophysics experiment.

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

Restrict lectured on statics to the first three weeks

Include more continuum mechanics, with derivations of stress and strain

Cast conservation laws in terms of stress and strain to prepare students for 110C and 111

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

None

Any other recommendations or comments?

No