## (B) ABET Criterion 3: Outcomes Met By Course Content

This brief content assessment should be consistent with the updated Course Syllabet

**Course #:** BEE 3650  **Title:** Properties of Biological Materials  
**Semester/Year:** Spring 2009  
**Instructor:** J A Bartsch

**Identify the outcomes associated with this course.**

Place a “P” or “S” in the left column and leave others blank.

**P** = Primary outcome that is assessed (suggest 2-3 Primary Outcomes)  
**S** = Secondary outcome that is also assessed

<table>
<thead>
<tr>
<th>P or S</th>
<th>Outcome</th>
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</thead>
<tbody>
<tr>
<td>P</td>
<td>(a) an ability to apply knowledge of mathematics, science, and engineering</td>
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<tr>
<td>P</td>
<td>(b) an ability to design and conduct experiments, as well as to analyze and interpret data</td>
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<td></td>
<td>(c) an ability to design a system, component, or process to meet desired needs</td>
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<td></td>
<td>(d) an ability to function on multi-disciplinary teams</td>
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<tr>
<td>P</td>
<td>(e) an ability to identify, formulate, and solve engineering problems</td>
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<td></td>
<td>(f) an understanding of professional and ethical responsibility</td>
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<tr>
<td>S</td>
<td>(g) an ability to communicate effectively</td>
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<td></td>
<td>(h) the broad education necessary to understand the impact of engineering solutions in a global and societal context</td>
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<tr>
<td></td>
<td>(i) a recognition of the need for, and an ability to engage in life-long learning</td>
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<td></td>
<td>(j) a knowledge of contemporary issues</td>
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<tr>
<td></td>
<td>(k) an ability to use the techniques, skills, and modern engineering tools necessary</td>
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<tr>
<td></td>
<td>(L) <strong>Use For Biological Engineering Major only</strong>, An ability to integrate modern biology with engineering principles</td>
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# (C) COURSE OUTCOMES ASSESSMENT MATRIX

**BEE 365-Properties of Biological materials**

Dept & Course No.: **BEE 3650**  
Semester: **S-2009**  
Name of Instructor: **J A Bartsch**

<table>
<thead>
<tr>
<th>Course Outcomes Specific to Course</th>
<th>ABET a-l criteria</th>
<th>How criterion is met</th>
<th>Examples of assessment</th>
<th>Assessment* Level of achievement relative to stated goal</th>
<th>Proposed Action</th>
</tr>
</thead>
</table>
| Apply knowledge of Math and science in experiments and analysis of bio- material properties | a | Thirteen weekly lab reports, one independent team based lab project, 6 homework problem sets, one midterm and a comprehensive final exam | Midterm Exam problems 3,5  
Final Exam problems 1,3,5,7,10,11 | Class mean score of 94.2%  
Class mean score of 71.3%  
Reinforcement & emphasis of concepts throughout course | No Changes proposed  
Reinforcement & emphasis of concepts & basics throughout course |
| Ability to design experiments and analyze data | b | Thirteen weekly lab reports, one independent team based lab project, 6 homework problem sets, one midterm and a comprehensive final exam | Midterm Exam problems 2,5  
Final Exam problems 5,8,10  
Independent team-based lab project | Class mean score of 86.5%  
Class mean score of 42.8%  
Class mean score of 93.4% ---- Reinforcement & emphasis of concepts throughout course | No changes proposed  
Focus on review of Mechanics & Statistics, emphasis on basics when new concepts for course are introduced and used |
| Ability to identify, formulate and solve Engineering problems | e | Thirteen weekly lab reports, one independent team based lab project, 6 homework problem sets, one midterm and a comprehensive final exam | HW #6,7,8  
Midterm Exam problems 1,3  
Final Exam problems 2,3,6,9,10,12 | Class mean score of 90.4%  
Class mean score of 91.7%  
Class mean score of 79.8%  
Reinforcement & emphasis of concepts throughout course | No change  
No change  
Review basics, emphasize these throughout course of semester |
| Ability to communicate effectively | g | Thirteen weekly lab reports, one independent team based lab project, 6 homework problem sets, one midterm and a comprehensive final exam | Weekly Lab reports  
Independent project presentation and final report | Mean Lab Report grade = 88.9%  
Independent project grade mean for class = 93.4%  
No changes in this area | No change in labs  
No change |

*A mean grade of 66.7% is threshold for achieving outcomes.*
(D) Course Enhancement Questionnaire

As part of on-going self-assessment for ABET accreditation, instructors are asked to complete this questionnaire for each course they teach each semester. Questionnaires from previous years will be provided to new instructors when the course instructor changes.

Please return to Undergraduate Program Coordinator when grades are submitted.

Dept & Course #: BEE 3650

Course Title: Properties of biological materials

Instructor: J A Bartsch

Semester: S-2009

Report Date: 05/22/09

1. In this offering of your course, have you made any of the following changes?

(a) Y / N - New or updated material is being taught (if Y, please describe)

No

(b) Y / N - Different or new technology is being used; i.e. presentations, web (if Y, please describe)

No

What motivated you to make the changes described above? What impact have the changes had on the outcomes in your course?

Emphasis is on applying engineering concepts from mechanics of materials and Biological & Life sciences. Mechanics as a subject does not resonate with all students, and this shows in some of the assessment data, I plan to ‘gently’ remind and consistently to review the relevant concepts throughout the semester. The students demonstrated their understanding in laboratory and project applications, unfortunately, all of them do not always demonstrate this ability on examinations.

What student feedback have you received in response to the changes you have made?

Previous changes included greater emphasis on statistical analysis and using basic statistical processes to analyze data, and this change has been successful.
2. Have you made any of the following changes to your course this term?

(e) Y / N - I have taken new steps to solicit student feedback (if Y, please describe)

N, but continue to use supplemental questions in course evaluations

(f) Y / N - I have made other changes (if Y, please describe)

No

3. Are you planning changes in the course for the next semester?

I will keep the midterm in class (50 minutes) with fewer questions to match the available time.

Introduce a lab or demonstration on torsion testing.

Early semester emphasis on role of water and moisture in material behavior and properties, more emphasis on review of statistics and stress transformations, de-emphasis on Rheology while placing greater emphasis on creep and relaxation models

4. What is the motivation for the planned changes? What impact(s) do you expect the changes to have on the outcomes in your course?

Students’ difficulty completing previous midterms in 50 minutes. Student and TA feedback regarding exam and grades on exam.

Cyclic testing of viscoelastic materials to quantify fatigue behavior

Emphasize basics and insure students have command of basics before exploring ‘new’ topics
BEE 3650 for Spring 2009

Course Evaluation Supplemental Questions Related to ABET Outcomes (a) through (k)
Responses to these and the standard course evaluation questions are provided to the
instructor and Department Chair by the Engineering College each term.

Dept & Course No.: _BEE 3650_ Semester: _S-09_ Name of Instructor: _J A Bartsch_

Please select (by checking the boxes) up to four (4) supplemental evaluation questions most appropriate to your course to be included in the end-of-semester on-line course evaluation by students. Please return your completed request to the Undergraduate Coordinator by the announced deadline.

Note that all the ABET Outcome questions will have the following instructions:
Answer: Check 1 through 5: _____ (1 = not helpful 5 = extremely helpful)

☐ (a) Did this course enhance your ability to apply knowledge of mathematics, science, and engineering?

☐ (b) Did this course enhance your ability to design and conduct experiments, as well as to analyze and interpret data?

☐ (e) Did this course improve your ability to identify, formulate, and solve engineering problems?

☐ (g) Did this course improve your ability to communicate effectively?