Expected Outcomes: Apply knowledge of science

Students should be able to apply their knowledge of science to the solution of engineering problems.

Related typical general education outcomes:

6  Ability to Solve Open-Ended Problems
11  Scientific Literacy

Assessment methods

Method: EBI surveys

Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.

Findings:

Average response of graduating seniors was 5.65 out of 7 when asked about the degree to which their engineering education enhanced their ability to apply knowledge of science to solve engineering problems. This indicates that students rated their abilities as moderate to good.

How did you use findings for improvement?

None

Additional comments:

None

Expected Outcomes: Apply knowledge of mathematics

Students should be able to apply their knowledge of mathematics to the solution of engineering problems.

Related typical general education outcomes:

5  Ability to Use Mathematical Methods

Assessment methods

Method: EBI surveys

Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.

Findings:

Average response of graduating seniors was 5.76 out of 7 when asked about the degree to which their engineering education enhanced their ability to apply knowledge of mathematics to solve engineering problems. This indicates that students rated their abilities as moderate to good.

How did you use findings for improvement?
We continue to look for ways to reinforce fundamental topics in upper level engineering courses.

Additional comments:
None

<table>
<thead>
<tr>
<th>Expected Outcomes: Apply knowledge of engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students should be able to apply their knowledge of engineering to the solution of problems.</td>
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</tbody>
</table>

Related typical general education outcomes:

<table>
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<tr>
<th>6</th>
<th>Ability to Solve Open-Ended Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Scientific Literacy</td>
</tr>
</tbody>
</table>

Assessment methods

Method: EBI surveys

Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.

Findings:

Average response of graduating seniors was 6.12 out of 7 when asked about the degree to which their engineering education enhanced their ability to apply knowledge of engineering to solve problems. This indicates that students rated their abilities as good.

How did you use findings for improvement?
None

Additional comments:
None

<table>
<thead>
<tr>
<th>Expected Outcomes: Design and conduct experiments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students should be able to design and conduct experiments and analyze and interpret data.</td>
</tr>
</tbody>
</table>

Related typical general education outcomes:

<table>
<thead>
<tr>
<th>5</th>
<th>Ability to Use Mathematical Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Ability to Solve Open-Ended Problems</td>
</tr>
<tr>
<td>11</td>
<td>Scientific Literacy</td>
</tr>
</tbody>
</table>

Assessment methods

Method: EBI surveys

Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.

Findings:

Average response of graduating seniors was 6.00 out of 7 when asked about the degree to which their engineering education enhanced their ability to design experiments. This indicates that
students rated their abilities as good. Average response of graduating seniors was 5.53 out of 7 when asked about the degree to which their engineering education enhanced their ability to conduct experiments. This indicates that students rated their abilities as moderate to good. Average response of graduating seniors was 5.82 out of 7 when asked about the degree to which their engineering education enhanced their ability to analyze and interpret data. This indicates that students rated their abilities as good.

**How did you use findings for improvement?**

We continue to look for additional opportunities to incorporate laboratories and data analysis and interpretation activities into courses.

**Additional comments:**

None

### Expected Outcomes: Design a system, component, or process

Students should be able to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;

**Related typical general education outcomes:**

- 5 Ability to Use Mathematical Methods
- 6 Ability to Solve Open-Ended Problems
- 11 Scientific Literacy

**Assessment methods**

**Method:** EBI surveys

Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.

**Findings:**

Average response of graduating seniors was 5.94 out of 7 when asked about the degree to which their engineering education enhanced their ability to design a system, component, or process. This indicates that students rated their abilities as good for designing systems, components, or processes.

**How did you use findings for improvement?**

The senior capstone course is scrutinized after each year to identify additional areas where improvements can be made in the design experience. The course has been split into two courses so that the spring semester can focus only on the design activities.

**Additional comments:**

None

### Expected Outcomes: Function on multidisciplinary teams

Students should be able to function on multidisciplinary teams.
Related typical general education outcomes:

6  Ability to Solve Open-Ended Problems
7  Written Communication
8  Oral Communication

Assessment methods

Method: EBI surveys
Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.

Findings:
Average response of graduating seniors was 5.88 out of 7 when asked about the degree to which their engineering education enhanced their ability to function on multidisciplinary teams. This indicates that students rated their abilities as good.

How did you use findings for improvement?
None

Additional comments:
None

Expected Outcomes: Solve engineering problems

Students should be able to identify, formulate, and solve engineering problems.

Related typical general education outcomes:

5  Ability to Use Mathematical Methods
6  Ability to Solve Open-Ended Problems
11  Scientific Literacy

Assessment methods

Method: EBI surveys
Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.

Findings:
Average response of graduating seniors was 6.12 out of 7 when asked about the degree to which their engineering education enhanced their ability to identify engineering problems. This indicates that students rated their abilities as good. Average response of graduating seniors was 5.88 out of 7 when asked about their ability to formulate engineering problems. This indicates that students rated their abilities as good. Average response of graduating seniors was 5.88 out of 7 when asked about their ability to solve engineering problems. This indicates that students rated their abilities as good.

How did you use findings for improvement?
None
Expected Outcomes: Understand professional and ethical responsibility

Students should be able to understand professional and ethical responsibility.

Related typical general education outcomes:
9 Informed and Engaged Citizenship
10 Intercultural Knowledge and Diversity Awareness

Assessment methods

Method: EBI surveys
Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.

Findings:
Average response of graduating seniors was 6.00 out of 7 when asked about the degree to which their engineering education enhanced their ability to understand ethical responsibilities. This indicates that students rated their abilities as good. Average response of graduating seniors was 6.24 out of 7 when asked about the degree to which their engineering education enhanced their ability to understand professional responsibilities. This indicates that students rated their abilities as very good.

How did you use findings for improvement?

Even though the findings are very good, we have increased the coverage of ethical and professional topics in a new course on professional practice in biosystems engineering.

Additional comments:
None

Expected Outcomes: Communicate effectively

Students should be able to communicate effectively using oral communication methods.

Related typical general education outcomes:
8 Oral Communication

Assessment methods

Method: EBI surveys
Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.

Findings:
Average response of graduating seniors was 6.35 out of 7 when asked about the degree to which their engineering education enhanced their ability to communicate using oral reports. This indicates that students rated their abilities as very good.
How did you use findings for improvement?

While these findings are good, they are the result of an increased emphasis in recent years on oral communication in the capstone design experience.

Additional comments:

None

Expected Outcomes: Communicate effectively - written

Students should be able to communicate effectively using written communication methods.

Related typical general education outcomes:

7 Written Communication

Assessment methods

Method: EBI surveys

Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.

Findings:

Average response of graduating seniors was 6.29 out of 7 when asked about the degree to which their engineering education enhanced their ability to use written communication. This indicates that students rated their abilities as very good.

How did you use findings for improvement?

While these findings are good, they are the result of an increased emphasis in recent years on written reports in the capstone design experience.

Additional comments:

None

Expected Outcomes: Gain a broad education

Students should be able to gain a broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

Related typical general education outcomes:

9 Informed and Engaged Citizenship
10 Intercultural Knowledge and Diversity Awareness
12 Aesthetic Appreciation and Engagement

Assessment methods

Method: EBI surveys

Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.

Findings:
Average response of graduating seniors was 5.35 out of 7 when asked about the degree to which their engineering education enhanced their ability to understand the impact of engineering solutions in a global/societal context. This indicates that students rated their abilities as moderate to good.

How did you use findings for improvement?

Additional guest speakers from outside the university have been invited to lecture on global/societal issues in several different courses. The professional practice course also has incorporated additional material on global challenges for engineering.

Additional comments:

None

**Expected Outcomes : Life long learning**

Students should recognize the need for, and an ability to engage in life-long learning.

Related typical general education outcomes:

1. Information Literacy
6. Ability to Solve Open-Ended Problems
11. Scientific Literacy

**Assessment methods**

**Method :** EBI surveys

Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.

**Findings:**

Average response of graduating seniors was 6.47 out of 7 when asked about the degree to which their engineering education enhanced their ability to engage in life long learning. This indicates that students rated their abilities as very good.

How did you use findings for improvement?

None

Additional comments:

None

**Expected Outcomes : Gain knowledge of contemporary issues**

Students should gain knowledge of contemporary issues.

Related typical general education outcomes:

1. Information Literacy
9. Informed and Engaged Citizenship
10. Intercultural Knowledge and Diversity Awareness

**Assessment methods**

**Method :** EBI surveys

Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.
**Method:** EBI surveys

Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.

**Findings:**

Average response of graduating seniors was 6.06 out of 7 when asked about the degree to which their engineering education enhanced their ability to understand contemporary issues. This indicates that students rated their abilities as good.

**How did you use findings for improvement?**

We have increased the number of guest lecturers in several courses to address contemporary issues.

**Additional comments:**

None

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**Expected Outcomes:** Tools of modern engineering practice

Students should be able to use the techniques, skills, and modern engineering tools necessary for engineering practice.

**Related typical general education outcomes:**

1. Information Literacy
2. Scientific Literacy

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**Assessment methods**

**Method:** EBI surveys

Educational Benchmarking Inc. surveys are administered to all graduating seniors in Biosystems Engineering.

**Findings:**

Average response of graduating seniors was 5.82 out of 7 when asked about the degree to which their engineering education enhanced their ability to use modern engineering tools. This indicates that students rated their abilities as good.

**How did you use findings for improvement?**

We continue to look for ways to incorporate new analytical and engineering tools into our courses. New laboratory equipment such as the total organic carbon analyzer has been purchased and used in laboratory activities.

**Additional comments:**

None