

## Program-Level





The use of performance indicators and rubric outcomes allows us to decouple student outcomes from student grades. Our analysis appears to validate this assessment method. We observed that students achieved passing grades while also obtaining a high level of achievement in the student learning outcomes. The performance indicators also allow us to more closely investigate the types of assignments given to students and how these assignments assess the outcomes.

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## Current ABET Learning Outcomes & BME Specific Criteria

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to apply engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

### ABET BME Specific Criteria

- A. Applying principles of engineering, biology, human physiology, chemistry, calculus-based physics, mathematics (through differential equations) and statistics
- B. Solving bio/biomedical engineering problems, including those associated with the interaction between living and non-living systems
- C.

# Outcome #1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics

	Unsatisfactory	Developing	Satisfactory	Exemplary
Formulate the problem and identify key issues / variables	<ul style="list-style-type: none"> <li>- Missing problem formulation</li> <li>- Missing most key issues/variable</li> <li>- Missing most criteria</li> <li>- Missing most constraints</li> <li>- Missing most assumptions</li> </ul>	<ul style="list-style-type: none"> <li>- Weak problem formulation</li> <li>- Some issues/variables identified, but many missing</li> <li>- Many criteria missing</li> <li>- Many constraints missing</li> <li>- Many assumptions missing</li> </ul>	<ul style="list-style-type: none"> <li>- Adequate problem formulation</li> <li>- Most key issues/variables are identified</li> <li>- Almost all criteria presented for ranking alternatives</li> <li>- Almost all constraints identified</li> <li>- Almost all assumptions identified</li> </ul>	<ul style="list-style-type: none"> <li>- Complete and succinct problem formulation</li> <li>- Key issues/variables identified</li> <li>- All relevant criteria presented for ranking alternatives</li> <li>- All relevant constraints identified</li> <li>- All relevant assumptions identified</li> </ul>
Recognize the need or potential				

**Outcome #2:** An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

	Unsatisfactory			

# Outcome #3: An ability to communicate effectively with a range of audiences

	Unsatisfactory	Developing	Satisfactory	Exemplary
Organize the material to be communicated, with any accompanying slides designed to look both professional and graphically appealing.	<ul style="list-style-type: none"> <li>- Little organization</li> <li>- Missing problem statement</li> <li>- Missing conclusion/summary</li> <li>- Missing other major sections</li> <li>- Missing references</li> <li>- Too much or small-font text</li> <li>- Missing /Low-quality graphics</li> <li>- Slides do not support speaker</li> </ul>	<ul style="list-style-type: none"> <li>- Confusing organization</li> <li>- Weak problem statement</li> <li>- Weak conclusion or summary</li> <li>- Other sections are weak</li> <li>- Weak list of references</li> <li>- Slides not graphically appealing (e.g. white space)</li> <li>- Verbiage not clear and concise</li> </ul>	<ul style="list-style-type: none"> <li>- Mostly logical and complete organization</li> <li>- Adequate problem statement</li> <li>- Adequate conclusion/summary</li> <li>- Adequate list of references</li> <li>- Slide content is clear</li> <li>- Images are relevant</li> </ul>	<ul style="list-style-type: none"> <li>- Excellent organization</li> <li>- Well-stated problem statement or purpose</li> <li>- Strong conclusion or summary</li> <li>- Thorough list of references</li> <li>- Images enhance the message</li> <li>- Text clear and concise</li> <li>- Very graphically appealing</li> </ul>
Presents content in own words, demonstrating comprehension of material				



**Outcome #4:** An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

	Unsatisfactory	Developing	Satisfactory	

**Outcome #5:** An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

	Unsatisfactory	Developing	Satisfactory	Exemplary
Establish a collaborative and inclusive team environment	- Does not provide			

**Outcome #6:** An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions



## Outcome #7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

	Unsatisfactory	Developing	Satisfactory	Exemplary
Identify necessary techniques, skills, and tools / resources for advancing research or technology	<ul style="list-style-type: none"> <li>- Identifies a small subset of necessary techniques, skills, and tools / resources</li> <li>- Identifies unrelated techniques, skills, and tools / resources</li> </ul>	<ul style="list-style-type: none"> <li>- Identifies some techniques, skills, and tools / resources, but missing some important items</li> <li>- Includes some unrelated techniques, skills, and tools / resources</li> </ul>	<ul style="list-style-type: none"> <li>- Identifies almost all of the relevant techniques, skills, and tools / resources</li> <li>- Missing some minor techniques, skills, and tools / resources</li> </ul>	<ul style="list-style-type: none"> <li>- Identifies all relevant techniques, skills, and tools / resources</li> </ul>
Explain the use of the new techniques, skills, and tools / resources	<ul style="list-style-type: none"> <li>- Provides little explanation of how the techniques, skills, and tools / resources should be used</li> <li>- Provides incorrect explanation of how to use the techniques, skills, and tools / resources</li> </ul>			



**Biomedical Engineering  
Form 3.5 Faculty Course Evaluation**

**Phase-2 (Indirect) Faculty Assessment:** *Discuss the basis for the indirect faculty assessment here. Please also provide your overall class assessment and, if necessary, an action plan to address concerns.*

Outcome	Unsatisfactory	Developing	Satisfactory	Exemplary	Overall Level
1					
2					
3					

<b>Outcome</b>	<b>Unsatisfactory</b>	<b>Developing</b>	<b>Satisfactory</b>	<b>Exemplary</b>	<b>Overall Level</b>
<b>A</b>					
<b>B</b>					
<b>C</b>					
<b>D</b>					

**Table F3.5-2: Summary of Phase**

## **Student Outcome Assessment Methods**

The assessment of student outcomes is a coordinated process involving the program constituents and designed to meet the institutional mission. The following sections describe the methods used, results, and analysis.

**Phase-1 (Direct) Assessment Method** ( de)4 (c)-5 (om5285.. A)1 (dFw 3.4 Td(T)1)T03 05MICID 2 B0(s  
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