

Engagement (SLO) – The graduate uses his or her knowledge and skills, including those associated with engineering and life science, to make a positive difference on issues of public concern.

Learning Indicators	Level 4	Level 3	Level 2	Level 1
	Master	Proficient	Apprentice	Novice
1.0 Demonstrates knowledge of current technological issues	Can evaluate various technologies and how they impact biomedical engineering; Can explain state -of-the-art in several technologies and what remains to be developed for successful implementation	Can describe various technologies and their impact on biomedical engineering; Can explain state-of-the-art in one or two technologies; Can describe what needs to be developed in at least one	Can describe some current technologies but does not relate them to biomedical engineering; Can describe the state-of-the-art in a technology with some idea of remaining development needed for implementation	Cannot describe fully any current technology or its relationship to biomedical engineering; Unable to fully describe the state-of-the-art of any current technology.
2.0 Ability to explain how different technical or engineering solutions to similar problems may be adopted in different parts of the world	Able to describe the impact of social and cultural factors on the implementation of an engineering solution; Can provide two or more examples of how such impacts alter the solutions being adopted.	Able to describe the impact of social and cultural factors on the implementation of an engineering solution; Can provide one example of how such impacts alter the solutions being adopted.	Demonstrates awareness that social and cultural factors may impact the implementation of engineering solutions but is unable to provide any examples. Cannot describe in any detail how such factors would generate different solutions	Does not demonstrate any awareness that social and/or cultural factors may influence implementation of an engineering solution; Adopts a "one size fits all" approach.
3.0 Ability to develop engineering solutions taking economic, environmental and societal factors into account	Incorporates economic, environmental and social factors into the design of solutions; Adapts the design to new situations when presented with them.	Incorporates economic, environmental and social factors into the design of solutions; Limited ability to adapt to new circumstances	Attempts to incorporate some economic, environmental and social factors into the design of solutions; Unable to adapt, however, to new circumstances.	Incorporates few, if any, economic, environmental or social factors into the design of solutions; Does not understand how or why engineers must adapt to new circumstances
4.0 Ability to describe the impact of governmental policies on the practice of biomedical engineering	Able to explain the roles played by the FDA, NRC and other agencies in product and device development and deployment; Can complete IRB and IACUC protocols satisfactorily	Able to explain the roles played by some governmental agencies in product/device development and deployment; Can fill out IRB and IACUC forms with assistance	Is aware that government agencies impact product/device development/deployment but is unable to explain how; Knows about IRBs and IACUCs but is unclear on exact roles	Is unaware that government agencies impact product/device development or deployment; Cannot explain roles played by IRBs or IACUCs in research

<p>5.0 Ability to predict how current trends and social concerns may effect implementation of engineering solutions</p>	<p>Can explain the issues surrounding several current controversies, such as stem cell research and genetic manipulation of foodstuffs; Is able to suggest how public might react to new controversies, such as neural implants connecting individuals to the Internet</p>	<p>Can explain the main issues of a current biomedical controversy and how public attitudes might effect biomedical research or implementation of an engineering solution; Can speculate on possible future points of contention and how these new issues might influence research and product development</p>	<p>Is aware of several issues generating controversy in biomedicine and engineering but cannot explain more than one side of any issue; Cannot explain how the controversies might effect research and development; Can see that new issues are likely to arise but cannot articulate those issues</p>	<p>Is unable to describe any current biomedical controversy in detail and cannot relate public opinions to any impact on research and development; Cannot speculate as to any potential future issues or controversies</p>
<p>6.0 Ability to infer unintended negative consequences of engineering solutions and plan remedial action</p>	<p>Understands that all solutions in the real world have multiple consequences; Is able to extrapolate to unusual or unexpected consequences; Incorporates remedial action for such consequences in engineering design</p>	<p>Understands that all solutions in the real world have multiple consequences; Is able to extrapolate to some unusual or unexpected consequences; Reacts to consequences after the fact but does not plan for them in original design</p>	<p>Limited understanding that solutions have multiple consequences; Operates as if engineering design is isolated from real world interactions; Does not plan for unintended consequences but recognizes them and attempts to react through redesign</p>	<p>No understanding that engineering solutions have multiple consequences; Designs solutions as if operating isolated from real world; Does not recognize unintended consequences and thus does not attempt remedial redesign</p>
<p>7.0 Ability and willingness to engage in service to the community at local and/or global levels</p>	<p>Has gained experience in 2 or more civic-engagement activities and can describe what he/she has learned about her or himself as it relates to a reinforced sense of personal identity and commitment to improving the conditions of the broader community.</p>	<p>Has experience in at least 1 civic engagement activity and can describe what he/she has learned about her or himself as it relates to a reinforced sense of personal identity and commitment to improving the conditions of the broader community.</p>	<p>May or may not have participated in a civic engagement activity but cannot describe how such engagement benefits her or himself personally. Sees civic engagement as beneficial in abstract rather than personal terms. Engagement done as a result of course or University expectations only.</p>	<p>Has not participated in any civic engagement activity and does not see such engagement as a personal goal. Cannot articulate how community involvement is beneficial.</p>