Student Learning Outcomes (SLOs) and Learning Indicators

Communication – The graduate employs an understanding of audience, purpose and context to communicate effectively in a range of situations using appropriate media while displaying a significant aptitude for presenting scientific and technical materials to diverse audiences.

C1 - Ability to concisely describe a problem, issue or situation along with current perspectives and potential new approaches.

C2 - Ability to use persuasive arguments, well-reasoned and supported by evidence, to support a thesis or position.

C3 - Ability to appropriately use equations and numerical expressions

C4 - Acknowledges the work of others in a consistent manner according to standard norms.

C5 - Ability to effectively communicate with diverse audiences.

C6 - Ability to effectively communicate in a variety of ways.

C7 – Ability to translate graphical material (illustrations, images, flowcharts, blueprints, circuit diagrams, experimental figures, etc.) into word-based descriptions

C8 – Ability to translate word-based descriptions into graphical material - Illustrations, images, flowcharts, blueprints, circuit diagrams, experimental figures, etc.

CO1 - Ability to create a visually stimulating and informative presentation.

CO2 - Ability to present clearly and maintain the interest of an audience in the material being presented.

CO3 - Ability to handle audience questions in a professional manner.

CW1 - Ability to create a well-organized document.

CW2 – Ability to create a document that is visually appealing

CW3 - Ability to use appropriate words and grammatical structure.

Engagement – 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.

E1 – Demonstrates knowledge of current technological issues.

E2 - Ability to explain how different technical or engineering solutions to similar problems may be needed and adopted in different parts of the world.

E3 - Ability to develop engineering solutions taking economic, environmental and societal factors into account.

E4 - Ability to describe the impact of governmental policies on the practice of biomedical engineering.

E5 - Ability to demonstrate awareness of how current trends and social concerns may effect implementation of engineering solutions.

E6 - Ability to infer unintended negative consequences of engineering solutions and plan remedial action.

E7 - Ability and willingness to engage in service to the community at local and/or global levels.

Draft Revisions – March 16, 2015

Ethical Reasoning, Behavior and Professionalism – The graduate recognizes ethical issues, considers multiple points of view, and uses critical ethical reasoning to determine the appropriate behavior to follow. The graduate thus demonstrates a high level of integrity and a positive work ethic combined with a thorough understanding of the ethical implications and obligations associated with the practice of biomedical engineering.

ERBP1 - Ability to treat others with respect and not discriminate on the basis of gender, race, religion, sexual orientation, social class, ethnic background, physical disability, marital status, national origin or other attribute not related to academic or research performance.

ERBP2 - Ability to articulate own ethical system and compare it with different perspectives and/or concepts.

ERBP3 - Recognizes ethical issues and applies ethical reasoning to the resolution of these issues.

ERBP4 - Understands the interplay between ethics, engineering and social structure within different cultures is able to adjust to different cultural perspectives.

ERBP5 - Ability to apply the ethical and professional standards of a biomedical engineer in obtaining, reporting and analyzing data.

ERBP6 - Ability to assess conflicts of interest and other issues of trust and act in accordance with professional and ethical standards.

ERBP7 - Ability to demonstrate an understanding of the rights and limitations associated with intellectual property and confidential intellectual property agreements.

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Innovation and Design – The graduate often asks questions and makes observations that lead to new ideas or hypotheses. He or she formulates innovative solutions while moving beyond the conventional to new methods blending creative and practical approaches, methods and designs which may involve pioneering applications along the interface of engineering and biology. The graduate has the ability to create quality products and processes that are state-of-the-practice in his or her field.

I&D1 - Ability to identify a problem or opportunity.

I&D2 - Ability to generate unique and/or original ideas to address a problem or opportunity.

I&D3 - Ability to create a practical design strategy.

I&D4 - Ability to delineate the scope of the project.

I&D5 - Ability to incorporate and evaluate the impact of realistic constraints on the project.

I&D6 - Ability to execute the strategy.

I&D7 - Ability to evaluate product or process.

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Leadership – The graduate is able to articulate a vision or goal in such a manner as to promote collaboration and successful implementation. The graduate displays a willingness to overcome adversity and work diligently in pursuit of goals, thus serving as a role model for others.

> **L1** - Able to set goals as well as develop and implement a plan capable of achieving those goals.
>
> **L2** - Ability to facilitate communication.
>
> **L3** - Assumes and delegates responsibilities.
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> **L4** - Able to balance task completion and interpersonal relationships.
>
> **L5** - Acts in a consistent and ethical manner which earns respect and credibility and motivates others to contribute to achieving common goals

Problem-Solving Abilities – The graduate is able to creatively solve problems from both analytic and synthetic perspectives using multiple approaches, integrating the life sciences, engineering, and the humanities. The graduate is able to recognize, incorporate and adapt to the limitations and consequences of applying various problem solutions.

PSA1 - Ability to apply a mathematical description to an engineering problem.

PSA2 - Ability to seek an optimized solution of an engineering problem.

PSA3 - Ability to analyze and use data in statistically appropriate fashion to solve an engineering problem.

PSA4 - Ability to decompose a problem into components that can be formulated with known mathematical/physical/biological models.

PSA5 - Ability to evaluate existing models of physical and biological systems.

PSA6 - Ability to simulate or represent biological systems via a mathematical or physical model.

Research Abilities – The graduate is able to collect and process data, information and knowledge to answer specific questions or generate new conceptual models and hypotheses. The graduate evaluates these models and hypotheses using the appropriate experimental, mathematical and statistical approaches.

RA1 - Ability to make observations and devise hypotheses to explain those observations.

RA2 - Ability to use library and online resources for research purposes.

RA3 - Ability to design an experiment to test a hypothesis.

RA4 - Ability to conduct experiments.

RA5 - Ability to analyze experiments using statistical, mathematical and/or computational methods.

Human Resources and Interactions – The graduate is able to work either independently or in diverse groups to effectively and efficiently to respond to academic and work requirements.

HR&I1 - Ability to set achievable goals and organize priorities, manage time and activities in a manner consistent with achieving these goals and monitor & evaluate progress.

HR&I2 - Displays sufficient courage to challenge conventional approaches and/or thinking and risk making mistakes. Manages risk through personal responsibility and learning from mistakes.

HR&I3 - When operating as part of a team, aids others to achieve group goals and objectives.

HR&I4 - When operating as part of a team, is able to adopt and adapt to different roles.

HR&I5 - Shows an appreciation for cultural diversity.

HR&I6 - Ability to interact productively with individuals of different disciplinary/ educational experiences.

Technological Skills – The graduate makes appropriate use of technologies to communicate, collaborate, solve problems, make decisions, and conduct research, as well as foster creativity and life-long learning. The graduate is able to use state-of-the-art technology and tools and keeps up on advancements in his or her field of study and/or practice.

TS1 - Ability to describe the principle of operation and technical specifications of equipment used for measuring physical, chemical, biological and/or physiological phenomena.

TS2 - Ability to select measuring equipment/techniques appropriate to a physical/chemical/ biological/physiological phenomena to be measured.

TS3 - Ability to use computers and computer software for analyzing and solving problems and justify application of hardware and software selected.