Problem-Solving Abilities (SLO) – 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.

Learning Indicators	Level 4	Level 3	Level 2	Level 1
	Master	**Proficient**	**Apprentice**	**Novice**
1.0 Ability to apply a mathematical description to an engineering problem	Always applies appropriate mathematical concepts using calculus and/or linear algebra solve engineering problems	Mostly applies appropriate mathematical concepts using calculus and/or linear algebra to engineering problems; May require help to choosing best mathematical approach	Sometimes applies correct mathematical concepts but is inconsistent. Does not demonstrate mastery of calculus and/or linear algebra in solving engineering problems	Seldom chooses correct mathematical concepts in problem-solving; Does not use calculus and/or linear algebra appropriately; Cannot solve engineering problems consistently without help
2.0 Ability to seek an optimized solution of an engineering problem	When a solution has multiple design inputs, seeks the optimum solution by mathematically or experimentally varying those inputs to maximize performance	Considers optimization and applies a reasonable/ methodology by varying inputs but overlooks some possibilities and may arrive an non-optimal result.	Is aware that optimization should be used but examines only two inputs to any solution; Applies a poor approach and/or incorrect methodology	Does not recognize the need for optimization; focuses on only one input to any solution; Does not use any approach to optimize results.
3.0 Ability to analyze and use data in statistically appropriate fashion to solve an engineering problem	A statistical analysis is done appropriate to the sample size and problem or experimental design; Assumptions are recognized and tested; Data graphs are provided and appropriately labeled	A statistical analysis is done appropriate to the sample size and problem or experimental design; Data graphs are' provided and appropriately labeled.	A statistical analysis is attempted although it may not be appropriate to the sample size or problem/design; Some data graphs are provided but are not always correctly labeled	No statistical analysis is attempted. Data graphs, if provided, are not correctly labeled and/or do not correctly represent the data.
4.0 Ability to decompose a problem into components that can be formulated with known mathematical/ physical/biological models	Able to recognize components of a problem, how these components interrelate and create an innovative solution at a systems level	Able to recognize most important components of a problem and design a reasonable solution based upon their inter-relationships	Some ability to recognize the components of a problem; Has difficulty synthesizing the components into a viable solution	Unable to break down a problem into its components; Cannot synthesize a solution to a problem when components are provided
5.0 Ability to evaluate existing models of physical and biological systems	Explains the context of the problem/situation being modeled; Analyzes multiple models using clear criteria; Demonstrates how models can be applied to make predictions and discusses possible errors	Demonstrates an understanding of the problem being modeled; Analyzes 2 models using clear criteria; Demonstrates how models can be applied to make some predictions and discusses at least one source of error	Demonstrates partial understanding of the task or problem being modeled; Can analyze one model using stated criteria; Demonstrates how model can be used to make some predictions	Unable to formulate the task or problem being modeled; Cannot explain how model relates to the problem or situation; Unable to demonstrate how model can be used to make predictions
6.0 Ability to simulate or represent biological systems via a mathematical or physical model	Formulates the task or problem being modeled; Develops relevant theories and assumptions for each model; Develops multiple models using math/physical techniques; Evaluates each model in relation to real-world predictions and modifies accordingly	Formulates the task or problem being modeled; Develops relevant theories and some assumptions for each model; Develops 2 contrasting models using math/physical techniques; Demonstrates how models can be used to make predictions.	Formulates the task or problem being modeled; Develops 1 model using math/physical techniques; Demonstrates how the model can be used to make some predictions	Does not demonstrate an understanding of the task or problem; Unable to develop a model; Cannot show how model can be used to make predictions