Student Learning Outcome (SLO) #2b – Apply scientific and quantitative reasoning to solve problems and increase knowledge

Quantitative Reasoning

Definition: Quantitative reasoning uses logical and mathematical representations to solve quantitative problems in a variety of contexts and everyday life situations. It uses the skills necessary to understand and create sophisticated arguments supported by quantitative evidence and to clearly communicate those arguments in a variety of formats including words, tables, graphs, mathematical equations, and other representations of quantitative data. Mathematics is an important function in solving problems and making decision that are derived from quantitative reasoning. It may use algebraic, numerical, symbolic, or graphical representations. It is based on underlying logical structures. Quantitative reasoning maybe applied to an understanding of the physical and natural world. The use of procedural skills is inherent to quantitative reasoning to generalize results and apply results to specific problems or decisions.

This SLO is met in the following General Education categories: C.2 – Understanding Science and Technology: Courses in this category model with mathematics, construct viable arguments, use appropriate tools strategically, and attain conceptual understanding. Courses explore technology in ways to understand these concepts.

	Performance Levels			
	4	**3**	**2**	**1**
Student output and quality of work	• Uses quantitative information in a correct solution or decision, and justifies the use of the representations of the information. • Calculations are successfully and sufficiently comprehensive to solve the problem They are clearly and concisely displayed • Provides a reasoned explanation of the solution or decision. • Reasons logically and interprets logical relationships among problem elements and solutions or decisions. • Provides reasoned accurate explanations of information presented in mathematical forms. • Makes appropriate inferences based on the results. The solution is presented in an effective format	• Correctly identifies quantitative information presented in a given problem, but does not accurately use the information in the solution or decision. • Calculations attempted are essentially successful and sufficiently comprehensive to solve the problem • Provides a correct solution or decision without an adequate explanation. • Logical reasoning is correct but incomplete. • Provides reasoned accurate explanations of information presented in mathematical forms. • Makes some appropriate inferences, though data may be presented in a less than complete format	• Incorrectly identifies quantitative information presented in a given problem. • Calculations attempted are either unsuccessful or represent only a portion of the calculations required to incomprehensively solve the problem • Provides an incomplete or incorrect solution decision for a given problem. • Reasoning does not follow logical principles. • Provides somewhat reasoned accurate explanations of information presented in mathematical forms • Does not effectively connect it to the argument or purpose of the work	• Provides little or no quantitative information from the stated problem. • Calculations are attempted but both unsuccessful and incomprehensive • Provides no solution or an incorrect solution not based on the stated problem. • Presents no logical reasoning for a presented solution. • Attempts to explain information presented in mathematical forms. • Draws incorrect conclusions, or provides no adequate numerical support