Assignment ID: _____ Reviewer Name: _____

Assessment Rubric: Transport Modeling Project

The transport modeling project is a required component of CHBE 424, a course taken by all CHBE majors. We are including the project in the student portfolio to provide assessment data relevant to program outcomes **a** and **e**.

a. …ability to apply knowledge of mathematics, science and engineering.
e. …ability to identify, formulate and solve engineering problems.

This assessment rubric is designed to help evaluate student performance relative to these outcomes.

Outcome a. …ability to apply knowledge of mathematics, science and engineering.

Outcome element	Unacceptable (0)	Marginal (1)	Acceptable (2)	Exceptional (3)	Points
Ability to apply knowledge of mathematics – basic math	Basic math elements are performed incorrectly	Significant math errors	Nearly correct solution; occasional small math error	Solution process includes checks to ensure no math errors	
Ability to apply knowledge of mathematics – solution process	No discernable logic in problem solution	Able to apply a straight-forward solution methodology, no evidence of innovation	Able to develop an appropriate algebraic solution methodology for a novel situation Able to apply a calculus-based solution method	Able to develop an appropriate calculus-based solution methodology for a novel situation	
Ability to apply knowledge of science	The science behind the project is non-existent, erroneous, or trivial	Some evidence of awareness of science, but poorly incorporated into project	Knowledge of science clearly articulated and incorporated into project	Exemplary knowledge of science displayed in project	
Ability to apply knowledge of engineering – application of math and science to real problems	No evidence of ability to connect math and science with real-world problems	The student's work provides little insight into the problem addressed.	The student's work is clearly relevant to the problem addressed and could contribute to a solution to the problem.	The student's work shows remarkable insight and helps to solve a real-world problem.	
Ability to apply knowledge of engineering – ability to make realistic assumptions and simplifications to make problems tractable	The student appears unwilling to make any assumptions or simplifications, resulting in an unsolvable problem. The student has made such sweeping simplifications that the solution has become useless.	The student shows little insight into making appropriate simplifications and assumptions.	Most simplifications and assumptions that were made are appropriate and produce a solution that still has relevance to the problem being considered feasible.	The student displays the ability to discern the major factors relevant to the problem and obtains a highly useful solution.	

Outcome e. …ability to identify, formulate and solve engineering problems.

Outcome element	Unacceptable (0)	Marginal (1)	Acceptable (2)	Exceptional (3)	Points
Ability to identify an engineering problem.	Unable to clearly identify the problem under consideration.	Has identified a real problem, but has not articulated the problem in sufficient detail to make solution viable.	Able to identify a real problem and describe the problem using engineering concepts.	Able to identify a real problem in a novel application area and describe the problem using relevant engineering concepts.	
Ability to formulate an engineering problem.	Unable to describe how previously studied engineering concepts apply to the problem.	Able to see how the problem relates to known engineering concepts, but unable to recast the problem in mathematical terms, or apply adequate engineering concepts to attempt a solution.	Able to move beyond a verbal description of the problem and apply appropriate math and engineering concepts to attempt a solution.	Demonstrates unusual insight in applying previously studied engineering concepts to a novel situation.	
Ability to solve an engineering problem.	Unable to correctly apply math and engineering tools to solve problems.	Follows rote methods without insight; sometimes uses math and engineering tools inappropriately.	Able to use appropriate math and engineering tools to obtain a solution to the problem.	Able to appropriately apply math and engineering tools in novel ways to obtain solutions to unique problems.	

Assessing the assessment tool…

After completing the assessment of the transport projects, please complete the following items on a fresh assessment form.

This assessment rubric was: [useless] -- | -- [marginal] -- | -- [helpful] -- | -- [awesome]

Suggestions for improving this tool…