

Degree: Bechalors in Chemical Engineering 2023-2024 Assessment Plan													
	Student Learning Outcome #1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.											
PLAN	Assessment Method(s)	(1) Direct Assessment of Momentum Transfer (CHEN 3311) final project											
	Proficiency	Must meet expectations according to attached rubric											
DO	Benchmark	75% of students must meet expectations											
	Results of Assessment	<p style="text-align: center;">SACS Learning Outcome 1, CHEN3311</p> <table border="1"> <caption>Assessment Results Data</caption> <thead> <tr> <th>Category</th> <th>Meets Expectations (%)</th> <th>Does Not Meet Expectations (%)</th> </tr> </thead> <tbody> <tr> <td>Identifies, Formulates</td> <td>100</td> <td>0</td> </tr> <tr> <td>Conflicting Technical Issues</td> <td>50</td> <td>50</td> </tr> <tr> <td>Appropriately Applies Engineering</td> <td>100</td> <td>0</td> </tr> </tbody> </table>	Category	Meets Expectations (%)	Does Not Meet Expectations (%)	Identifies, Formulates	100	0	Conflicting Technical Issues	50	50	Appropriately Applies Engineering	100
Category	Meets Expectations (%)	Does Not Meet Expectations (%)											
Identifies, Formulates	100	0											
Conflicting Technical Issues	50	50											
Appropriately Applies Engineering	100	0											
S T U D Y	Analysis of Results	<p>The Outcome Assessment Team identified a problem in Outcome b, “Can solve problems with conflicting technical issues.” It was determined that 50% of students cannot “find a reasonable solution to an open-ended problem with conflicting technical issues, even if optimization is somewhat limited.” Specifically, students made no attempt to optimize their design which was dependent on several conflicting factors, e.g. energy used for heating their fluid, viscosity of their fluid, pumping costs, pump size, pipe size, etc. Students chose an initial system that met the minimal performance requirements and made no attempt to change parameters to improve performance. This open-ended project does address a concern of the Advisory Council from</p>											

		Fall 2022 by including curriculum that is directly related to the petrochemical industries.
ACT	Improvement Plan for 2024-2025	This is the first time this open-ended problem was given to CHEN 3311 and the importance of optimization, which emphasized in the project instructions, should be emphasized even more in the rubric. Course instruction will be given on optimization to see if the deficiency is fixed. If an emphasis on optimization doesn't lead to increased optimization attempts by the students, instruction about optimization procedures can be introduced into the course.

SACS Outcome 1, 2024 rubric: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

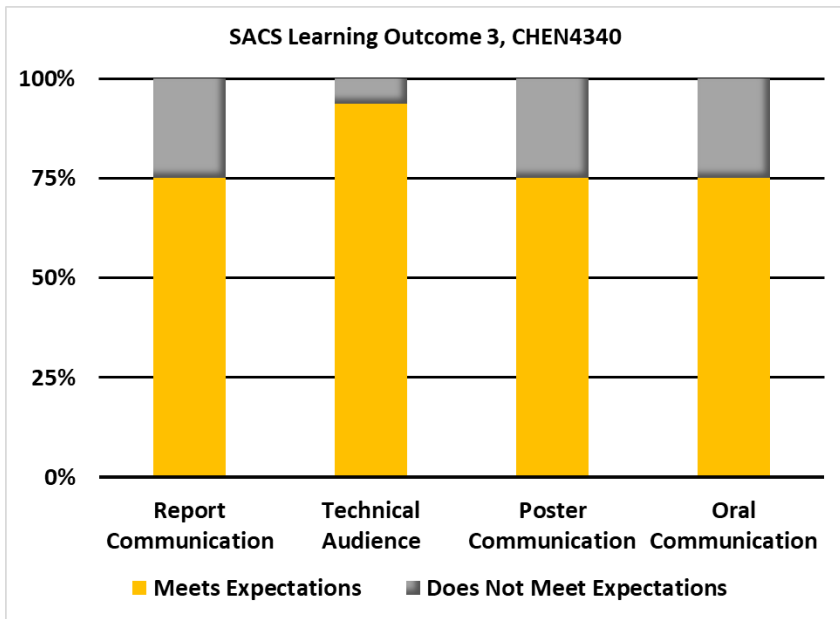
CATEGORY	Meets expectations	Does not meet expectations
Identifies and Formulates Complex Problems (a)	Can convert an open-ended problem with no obvious solution into a quantitative problem statement by applying engineering, mathematical, and scientific theory, but may be in a way that produces sub-optimal results	cannot produce an appropriate problem statement.
Can solve problems with conflicting technical issues (b)	Can find a reasonable solution to an open-ended problem with conflicting technical issues, even if optimization is somewhat limited.	Can't find a solution to an open-ended problem with conflicting technical issues, or the solution has many logical flaws or no attempt to improve the solution by optimization.
Appropriately applies math, engineering, and science to achieve a solution (c)	The solution method to the complex problem uses the correct theory from math, engineering, and science, but some theoretical or computational errors are allowable.	The solution method to the complex problem does not use appropriate theory or the theory from math, engineering, and science has major logical or computation errors.
Score		

Degree: PhD in Chemical Engineering 2023-2024 Assessment Plan																
	Student Learning Outcome #2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors														
PLAN	Assessment Method(s)	(1) Direct Assessment of the Engineering Capstone Projects														
	Proficiency	Must meet expectations according to attached rubric														
DO	Benchmark	75% of students must meet expectations														
	Results of Assessment	<div><p>SACS Learning Outcome 2, CHEN4320</p><p>The bar chart displays the percentage of students meeting expectations for SACS Learning Outcome 2, CHEN4320. The y-axis represents the percentage from 0% to 100% in 25% increments. The x-axis lists four categories: Meets Specific Needs, Public Health, Safety, and Welfare. All four categories show a 100% bar in yellow, indicating that all students met expectations. A legend at the bottom shows a yellow square for 'Meets Expectations' and a grey square for 'Does Not Meet Expectations'.</p><table border="1"><thead><tr><th>Category</th><th>Meets Expectations (%)</th><th>Does Not Meet Expectations (%)</th></tr></thead><tbody><tr><td>Meets Specific Needs</td><td>100</td><td>0</td></tr><tr><td>Public Health</td><td>100</td><td>0</td></tr><tr><td>Safety</td><td>100</td><td>0</td></tr><tr><td>Welfare</td><td>100</td><td>0</td></tr></tbody></table></div>	Category	Meets Expectations (%)	Does Not Meet Expectations (%)	Meets Specific Needs	100	0	Public Health	100	0	Safety	100	0	Welfare	100
Category	Meets Expectations (%)	Does Not Meet Expectations (%)														
Meets Specific Needs	100	0														
Public Health	100	0														
Safety	100	0														
Welfare	100	0														

		<div><p>SACS Learning Outcome 2, CHEN4320</p><p>The bar chart displays the percentage of benchmarks met for SACS Learning Outcome 2, CHEN4320. The y-axis represents the percentage from 0% to 100% in 25% increments. The x-axis lists five categories: Global Factors, Cultural Factors, Social Factors, Environmental Factors, and Economic Factors. All five categories have a yellow bar reaching the 100% mark, indicating that all benchmarks were met. A legend at the bottom shows a yellow square for 'Meets Expectations' and a grey square for 'Does Not Meet Expectations'.</p><table border="1"><thead><tr><th>Category</th><th>Meets Expectations (%)</th><th>Does Not Meet Expectations (%)</th></tr></thead><tbody><tr><td>Global Factors</td><td>100</td><td>0</td></tr><tr><td>Cultural Factors</td><td>100</td><td>0</td></tr><tr><td>Social Factors</td><td>100</td><td>0</td></tr><tr><td>Environmental Factors</td><td>100</td><td>0</td></tr><tr><td>Economic Factors</td><td>100</td><td>0</td></tr></tbody></table></div>	Category	Meets Expectations (%)	Does Not Meet Expectations (%)	Global Factors	100	0	Cultural Factors	100	0	Social Factors	100	0	Environmental Factors	100	0	Economic Factors	100	0
Category	Meets Expectations (%)	Does Not Meet Expectations (%)																		
Global Factors	100	0																		
Cultural Factors	100	0																		
Social Factors	100	0																		
Environmental Factors	100	0																		
Economic Factors	100	0																		
S T U D Y	Analysis of Results	All benchmarks were met in Spring 2024. This is partially as a result to responding to the a previous assessment action items. The students were required to prepare information specific to the Eight Factors described as pertaining to their projects, rather than general, Wikipedia-type information. This was a big success and the students a lot about these topics.																		
ACT	Improvement Plan for 2024-2025	At this time, no improvement plan is necessary.																		

SACS Outcome 2, 2024 rubric: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

CATEGORY	Meets Expectations	Does Not Meet Expectations
Meets Specific Needs	The project meets most of the specific needs and requirements of the design specifications while respecting most of the design constraints.	The project does not meet or only meets only some of the specific needs and requirements of the design specifications while respecting some of the design constraints.
Considers Public Health	Public health was adequately considered in the context of their unique design solution	Public health was not considered or only considered in a general context, but not to their unique design solution
Considers Safety	Safety was adequately considered in the context of their unique design solution	Safety was not considered or only considered in a general context, but not to their unique design solution
Considers Welfare	Welfare was adequately considered in the context of their unique design solution	Welfare was not considered or only considered in a general context, but not to their unique design solution.
Considers Global Factors	The global effects of the project were adequately considered in the context of their unique design solution	The global effects of the project were not considered or only considered in a general context, but not to their unique design solution
Considers Cultural Factors	The cultural effects of the project were adequately considered in the context of their unique design solution	The cultural effects of the project were not considered or only considered in a general context, but not to their unique design solution
Considers Social Factors	The social effects of the project were adequately considered in the context of their unique design solution	The social effects of the project were not considered or only considered in a general context, but not to their unique design solution
Considers Environmental Factors	The environmental effects of the project were adequately considered in the context of their unique design solution	The environmental effects of the project were not considered or only considered in a general context, but not to their unique design solution
Considers Economic Factors	The economic effects of the project were adequately considered in the context of their unique design solution	The economic effects of the project were not considered or only considered in a general context, but not to their unique design solution

Degree: PhD in Chemical Engineering 2023-2024 Assessment Plan																
	Student Learning Outcome #3	Students Will Demonstrate An Ability to Communicate with a Technical Audience														
PLAN	Assessment Method(s)	(1) Direct Assessment of Capstone Project Reports (Report Communications) (2) Direct Assessment of Capstone Project Oral Presentations (Technical Audience, Oral Communication) (3) Direct Assessment of Capstone Project Poster Presentations (Poster Communication)														
	Proficiency	Must meet expectations according to the rubric below														
DO	Benchmark	75% of students must meet expectations														
	Results of Assessment	 <p style="text-align: center;">SACS Learning Outcome 3, CHEN4340</p> <table border="1"> <thead> <tr> <th>Category</th> <th>Meets Expectations (%)</th> <th>Does Not Meet Expectations (%)</th> </tr> </thead> <tbody> <tr> <td>Report Communication</td> <td>75%</td> <td>25%</td> </tr> <tr> <td>Technical Audience</td> <td>75%</td> <td>25%</td> </tr> <tr> <td>Poster Communication</td> <td>75%</td> <td>25%</td> </tr> <tr> <td>Oral Communication</td> <td>75%</td> <td>25%</td> </tr> </tbody> </table>	Category	Meets Expectations (%)	Does Not Meet Expectations (%)	Report Communication	75%	25%	Technical Audience	75%	25%	Poster Communication	75%	25%	Oral Communication	75%
Category	Meets Expectations (%)	Does Not Meet Expectations (%)														
Report Communication	75%	25%														
Technical Audience	75%	25%														
Poster Communication	75%	25%														
Oral Communication	75%	25%														
S T U D Y	Analysis of Results	<p>All benchmarks were met in Spring 2024. Methods implemented in 2023 were successful in improving student performance. Specifically, the students had more rehearsal resources available to them and the project groups all had multiple opportunities to rehearse their oral presentations and were able to get more feedback on their posters.</p>														

ACT	Improvement Plan for 2024-2025	The reports, posters and oral communications barely met the benchmark. Efforts that improved performance will be increased as we watch the progression of proficiency going forward.
------------	---	--

SACS Outcome 3, 2024 Rubric: An ability to communicate with a technical audience

CATEGORY	Meets Expectations	Does Not Meet Expectations
Report Communication	Report contains all required information with minimal writing errors per page. Sample calculations are correct and explained.	Report has an unacceptable amount of writing errors per page. Sample calculations are not put in context or properly explained.
Ability to communicate to a technical audience	The communication is comprehensible and appropriate to academic, industrial, and technical people in the field.	The communication is not completely comprehensible and/or not appropriate to academic, industrial, and technical people in the field.
Poster Communication	Figures and tables are appropriately formatted, referenced, legible and explained with minimal errors. References are complete and appropriate.	Figures and tables have an unacceptable number of errors or have aspects of illegibility or inadequate explanations.
Oral Communication	Group presentation can be up to 2 minutes longer or 4 minutes too shorter than assigned duration. Up to one of the following can be lacking: Good eye contact, use of proper American English, appropriate response to questions and general professionalism (appropriate attire, etc.).	Group presentation time is more than 2 minutes longer or 4 minutes shorter than the assigned duration. Lacks more than one of following: Good eye contact, use of proper American English, appropriate response to questions, and general professionalism.