

Academic Year 2025-2026

MES-Chemical Engineering - MES-MSCH Learning Outcomes

Application of Engineering, Science, and Mathematics Principles **MET**

Students will demonstrate an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

MEASURES	RESULTS	ACTIONS																														
Thesis Proficiency is 3 out of 4 Direct - Other Target 75% of students achieve the proficiency mentioned above	MET Thesis ■ Met  0%100% Values are not shown when too close to each other. Click or use arrow keys to see details. <table><tr><td>Met:</td><td>100%</td></tr><tr><td>Met Total:</td><td>100%</td></tr><tr><td>Not Met Total:</td><td></td></tr></table> Summary Faculty evaluating the thesis work were asked to evaluate each student on the SLO based on the approved rubric. The results of the faculty evaluations are below: <table><tr><td>Performance Indicator</td><td>Proficiency %</td><td>Non-Proficiency %</td><td>Average Score</td></tr><tr><td colspan="4">Faculty Evaluations (Thesis)</td></tr><tr><td>1a</td><td>100.0%</td><td>0.0%</td><td>3.60</td></tr><tr><td>1b</td><td>100.0%</td><td>0.0%</td><td>3.40</td></tr><tr><td>1c</td><td>100.0%</td><td>0.0%</td><td>3.40</td></tr><tr><td>Overall</td><td>100.0%</td><td>0.0%</td><td>3.47</td></tr></table> The faculty evaluation data include 5 assessment records for thesis work when the assessment method provided reasonable and useful evidence for SLO #1. The numbers presented are summary statistics.	Met:	100%	Met Total:	100%	Not Met Total:		Performance Indicator	Proficiency %	Non-Proficiency %	Average Score	Faculty Evaluations (Thesis)				1a	100.0%	0.0%	3.60	1b	100.0%	0.0%	3.40	1c	100.0%	0.0%	3.40	Overall	100.0%	0.0%	3.47	No actions have been added.
Met:	100%																															
Met Total:	100%																															
Not Met Total:																																
Performance Indicator	Proficiency %	Non-Proficiency %	Average Score																													
Faculty Evaluations (Thesis)																																
1a	100.0%	0.0%	3.60																													
1b	100.0%	0.0%	3.40																													
1c	100.0%	0.0%	3.40																													
Overall	100.0%	0.0%	3.47																													
Student Survey Proficiency is a 3 out of 4 Indirect - Survey Target 75% of students achieve the proficiency mentioned above	MET Student Survey ■ Met  0%100% Values are not shown when too close to each other. Click or use arrow keys to see details. <table><tr><td>Met:</td><td>100%</td></tr><tr><td>Met Total:</td><td>100%</td></tr><tr><td>Not Met Total:</td><td></td></tr></table>	Met:	100%	Met Total:	100%	Not Met Total:		No actions have been added.																								
Met:	100%																															
Met Total:	100%																															
Not Met Total:																																

	Summary The students were asked to reflect on their own abilities for each indicator related to SLO #1 by completing the approved survey. The results of the student self-assessments are below: <table><tr><th>Performance Indicator</th><th>Proficiency %</th><th>Non-Proficiency %</th><th>Average Score</th></tr><tr><td colspan="4">Student Self-Evaluations (Survey)</td></tr><tr><td>1a</td><td>100.0%</td><td>0.0%</td><td>4.00</td></tr><tr><td>1b</td><td>100.0%</td><td>0.0%</td><td>4.00</td></tr><tr><td>1c</td><td>100.0%</td><td>0.0%</td><td>4.00</td></tr><tr><td>Overall</td><td>100.0%</td><td>0.0%</td><td>4.00</td></tr></table> The student survey data include 2 student responses. The numbers presented are summary statistics.	Performance Indicator	Proficiency %	Non-Proficiency %	Average Score	Student Self-Evaluations (Survey)				1a	100.0%	0.0%	4.00	1b	100.0%	0.0%	4.00	1c	100.0%	0.0%	4.00	Overall	100.0%	0.0%	4.00	
Performance Indicator	Proficiency %	Non-Proficiency %	Average Score																							
Student Self-Evaluations (Survey)																										
1a	100.0%	0.0%	4.00																							
1b	100.0%	0.0%	4.00																							
1c	100.0%	0.0%	4.00																							
Overall	100.0%	0.0%	4.00																							

Conclusion

Analysis of Results - SLO #1

Per the above section, proficiency as indicated by the combined results is 100.0%. This indicates an acceptable level of proficiency overall for the students completing the MES degree in chemical engineering. Both faculty evaluations and student self-evaluations met the 75% benchmark. The faculty evaluation average was 3.47, while the student self-evaluation average was 4.00. This indicates that students are meeting expectations for this SLO through both direct thesis-based assessment and student reflection. Looking deeper into the performance indicators, all assessed indicators achieved 100.0% proficiency. The lowest faculty average score was for 1b, with an average score of 3.40. This score is above the minimum acceptable threshold, but it remains an appropriate area for continued monitoring.

Improvement Plan - SLO #1

Because the benchmark was met for all performance indicators, major curriculum changes are not warranted based on this assessment cycle. However, the program should continue to maintain continuous improvement and guard against performance decreases in future assessment cycles. To that end, the following improvement steps are proposed:

- Present the findings to department faculty to confirm that thesis advising and graduate coursework continue to promote students' abilities to identify, formulate, and solve complex engineering problems.
- Continue emphasizing complete engineering problem-solving procedures, including problem identification, mathematical formulation, solution method, and interpretation of results.
- Encourage thesis committees to provide consistent feedback on the formulation and solution of research problems during proposal, research, and defense milestones.
- Continue evaluating graduate coursework and thesis expectations to ensure alignment with SLO #1.

Conduct experiments, analyze data, and draw engineering conclusions **MET**

Students will demonstrate an ability to develop and conduct appropriate experimentation or numerical simulation, analyze and interpret data, and use engineering judgment to draw conclusions and produce solutions appropriately.

MEASURES	RESULTS	ACTIONS
Thesis Proficiency is 3 out of 4 on rubric Direct - Other Target 75% of students achieve the proficiency mentioned above	MET Thesis ■ Met 0% 100% <i>Values are not shown when too close to each other. Click or use arrow keys to see details.</i>	No actions have been added.

	Met:100% Met Total:100% Not Met Total: Summary Faculty evaluating the thesis work were asked to evaluate each student on the SLO based on the approved rubric. The results of the faculty evaluations are below: <table><thead><tr><th>Performance Indicator</th><th>Proficiency %</th><th>Non-Proficiency %</th><th>Average Score</th></tr></thead><tbody><tr><td colspan="4">Faculty Evaluations (Thesis)</td></tr><tr><td>2a</td><td>100.0%</td><td>0.0%</td><td>3.75</td></tr><tr><td>2b</td><td>100.0%</td><td>0.0%</td><td>3.75</td></tr><tr><td>2c</td><td>100.0%</td><td>0.0%</td><td>3.25</td></tr><tr><td>Overall</td><td>100.0%</td><td>0.0%</td><td>3.58</td></tr></tbody></table> The faculty evaluation data include 4 assessment records for thesis work when the assessment method provided reasonable and useful evidence for SLO #2. The numbers presented are summary statistics.	Performance Indicator	Proficiency %	Non-Proficiency %	Average Score	Faculty Evaluations (Thesis)				2a	100.0%	0.0%	3.75	2b	100.0%	0.0%	3.75	2c	100.0%	0.0%	3.25	Overall	100.0%	0.0%	3.58	
Performance Indicator	Proficiency %	Non-Proficiency %	Average Score																							
Faculty Evaluations (Thesis)																										
2a	100.0%	0.0%	3.75																							
2b	100.0%	0.0%	3.75																							
2c	100.0%	0.0%	3.25																							
Overall	100.0%	0.0%	3.58																							
Student Survey Proficiency is 3 out of 4 Indirect - Survey Target 75% of students achieve the proficiency mentioned above	MET Student Survey Met 0%100% Values are not shown when too close to each other. Click or use arrow keys to see details. Met:100% Met Total:100% Not Met Total: Summary The students were asked to reflect on their own abilities for each indicator related to SLO #2 by completing the approved survey. The results of the student self-assessments are below: <table><thead><tr><th>Performance Indicator</th><th>Proficiency %</th><th>Non-Proficiency %</th><th>Average Score</th></tr></thead><tbody><tr><td colspan="4">Student Self-Evaluations (Survey)</td></tr><tr><td>2a</td><td>100.0%</td><td>0.0%</td><td>4.00</td></tr><tr><td>2b</td><td>100.0%</td><td>0.0%</td><td>4.00</td></tr><tr><td>2c</td><td>100.0%</td><td>0.0%</td><td>4.00</td></tr><tr><td>Overall</td><td>100.0%</td><td>0.0%</td><td>4.00</td></tr></tbody></table> The student survey data include 2 student responses. The numbers presented are summary statistics.	Performance Indicator	Proficiency %	Non-Proficiency %	Average Score	Student Self-Evaluations (Survey)				2a	100.0%	0.0%	4.00	2b	100.0%	0.0%	4.00	2c	100.0%	0.0%	4.00	Overall	100.0%	0.0%	4.00	No actions have been added.
Performance Indicator	Proficiency %	Non-Proficiency %	Average Score																							
Student Self-Evaluations (Survey)																										
2a	100.0%	0.0%	4.00																							
2b	100.0%	0.0%	4.00																							
2c	100.0%	0.0%	4.00																							
Overall	100.0%	0.0%	4.00																							

Conclusion

Analysis of Results - SLO #2

Per the above section, proficiency as indicated by the combined results is 100.0%. This indicates an acceptable level of proficiency overall for the students completing the MES degree in chemical engineering.

Both faculty evaluations and student self-evaluations met the 75% benchmark. The faculty evaluation average was 3.58, while the student self-evaluation average was 4.00. This indicates that students are meeting expectations for this SLO through both direct thesis-based assessment and student reflection.

Looking deeper into the performance indicators, all assessed indicators achieved 100.0% proficiency. The lowest faculty average score was for 2c, with an average score of 3.25. This score is above the minimum acceptable threshold, but it remains an appropriate area for continued monitoring.

Improvement Plan - SLO #2

Because the benchmark was met across all performance indicators, no major curriculum change is required based on the present results. However, the program should continue to strengthen the consistency with which students develop experimentation or simulation plans, analyze data, and draw engineering conclusions. To that end, the following improvement steps are proposed:

- Present the findings to department faculty to confirm that thesis work continues to require appropriate experimentation or numerical simulation, data analysis, interpretation, and engineering judgment.
- Continue emphasizing clear research objectives, appropriate experimental or simulation procedures, reproducible data collection, and rigorous data analysis.
- Encourage thesis committees to provide early feedback on data quality, graphical presentation, modeling, and interpretation of results.
- Maintain expectations that thesis conclusions are supported by engineering judgment and evidence from the data.

Ability to use modern engineering tools **MET**

Students will demonstrate an ability to use modern engineering tools to produce engineering analysis in a systematic manner.

MEASURES	RESULTS	ACTIONS																				
Thesis Proficiency is a 3 out of 4 Direct - Other Target 75% of students achieve the proficiency mentioned above	MET Thesis Met 0%100% Values are not shown when too close to each other. Click or use arrow keys to see details. Met: 100% Met Total: 100% Not Met Total: Summary Faculty evaluating the thesis work were asked to evaluate each student on the SLO based on the approved rubric. The results of the faculty evaluations are below: <table><tr><th>Performance Indicator</th><th>Proficiency %</th><th>Non-Proficiency %</th><th>Average Score</th></tr><tr><td colspan="4">Faculty Evaluations (Thesis)</td></tr><tr><td>3a</td><td>100.0%</td><td>0.0%</td><td>4.00</td></tr><tr><td>3b</td><td>100.0%</td><td>0.0%</td><td>3.50</td></tr><tr><td>Overall</td><td>100.0%</td><td>0.0%</td><td>3.75</td></tr></table> The faculty evaluation data include 4 assessment records for thesis work when the assessment method provided reasonable and useful evidence for SLO #3. The numbers presented are summary statistics.	Performance Indicator	Proficiency %	Non-Proficiency %	Average Score	Faculty Evaluations (Thesis)				3a	100.0%	0.0%	4.00	3b	100.0%	0.0%	3.50	Overall	100.0%	0.0%	3.75	No actions have been added.
Performance Indicator	Proficiency %	Non-Proficiency %	Average Score																			
Faculty Evaluations (Thesis)																						
3a	100.0%	0.0%	4.00																			
3b	100.0%	0.0%	3.50																			
Overall	100.0%	0.0%	3.75																			

Student Survey Proficiency is 3 out of 4 Indirect - Survey Target 75% of students achieve the proficiency mentioned above	MET Student Survey Met </
--	---

Conclusion

Analysis of Results - SLO #3

Per the above section, proficiency as indicated by the combined results is 100.0%. This indicates an acceptable level of proficiency overall for the students completing the MES degree in chemical engineering.

Both faculty evaluations and student self-evaluations met the 75% benchmark. The faculty evaluation average was 3.75, while the student self-evaluation average was 3.75. This indicates that students are meeting expectations for this SLO through both direct thesis-based assessment and student reflection.

Looking deeper into the performance indicators, all assessed indicators achieved 100.0% proficiency. The lowest faculty average score was for 3b, with an average score of 3.50. This score is above the minimum acceptable threshold, but it remains an appropriate area for continued monitoring.

Improvement Plan - SLO #3

Because the benchmark was met across all performance indicators, no major curriculum change is required based on the present results. However, the program should continue to maintain intentional coverage of modern engineering tools and systematic analysis methods in thesis work. To that end, the following improvement steps are proposed:

- Present the findings to department faculty to confirm that thesis work continues to require appropriate use of modern engineering tools.
- Continue providing access to modern tools, software, instrumentation, and analysis methods needed for thesis research.
- Encourage thesis committees to evaluate not only tool use, but also the quality and systematic nature of the resulting engineering analysis.
- Continue identifying opportunities for students to strengthen computational, experimental, statistical, and modeling skills relevant to thesis work.

Complete and Communicate Masters Thesis MET

Students will demonstrate an ability to complete a master thesis and effectively communicate the thesis work with a range of audiences

MEASURES	RESULTS	ACTIONS
----------	---------	---------

Thesis Report Proficiency is a 3 out of 4 Direct - Other Target 75% of students will achieve the proficiency	MET Thesis Report Met 0%100% Values are not shown when too close to each other. Click or use arrow keys to see details. Met:100% Met Total:100% Not Met Total: Summary Faculty evaluating the thesis and final thesis defense were asked to evaluate each student on the SLO based on the approved rubric. The results of the faculty evaluations are below: <table><tr><th>Performance Indicator</th><th>Proficiency %</th><th>Non-Proficiency %</th><th>Average Score</th></tr><tr><td colspan="4">Faculty Evaluations (Thesis and Final Thesis Defense)</td></tr><tr><td>4a</td><td>100.0%</td><td>0.0%</td><td>3.25</td></tr><tr><td>4b</td><td>100.0%</td><td>0.0%</td><td>3.50</td></tr><tr><td>4c</td><td>100.0%</td><td>0.0%</td><td>3.75</td></tr><tr><td>4d</td><td>100.0%</td><td>0.0%</td><td>3.25</td></tr><tr><td>Overall</td><td>100.0%</td><td>0.0%</td><td>3.44</td></tr></table> The faculty evaluation data include 4 assessment records for the thesis and final thesis defense. The numbers presented are summary statistics.	Performance Indicator	Proficiency %	Non-Proficiency %	Average Score	Faculty Evaluations (Thesis and Final Thesis Defense)				4a	100.0%	0.0%	3.25	4b	100.0%	0.0%	3.50	4c	100.0%	0.0%	3.75	4d	100.0%	0.0%	3.25	Overall	100.0%	0.0%	3.44	No actions have been added.
Performance Indicator	Proficiency %	Non-Proficiency %	Average Score																											
Faculty Evaluations (Thesis and Final Thesis Defense)																														
4a	100.0%	0.0%	3.25																											
4b	100.0%	0.0%	3.50																											
4c	100.0%	0.0%	3.75																											
4d	100.0%	0.0%	3.25																											
Overall	100.0%	0.0%	3.44																											
Final Thesis Defense Proficiency is a 3 out of 4 Direct - Presentation Target 75% of students achieve the proficiency mentioned above	MET Final Thesis Defense Met 0%100% Values are not shown when too close to each other. Click or use arrow keys to see details. Met:100% Met Total:100% Not Met Total: Summary Faculty evaluating the thesis and final thesis defense were asked to evaluate each student on the SLO based on the approved rubric. The results of the faculty evaluations are below:	No actions have been added.																												

Performance Indicator	Proficiency %	Non-Proficiency %	Average Score
Faculty Evaluations (Thesis and Final Thesis Defense)			
4a	100.0%	0.0%	3.25
4b	100.0%	0.0%	3.50
4c	100.0%	0.0%	3.75
4d	100.0%	0.0%	3.25
Overall	100.0%	0.0%	3.44
The faculty evaluation data include 4 assessment records for the thesis and final thesis defense. The numbers presented are summary statistics.			

Conclusion

Analysis of Results - SLO #4

Per the above section, proficiency as indicated by the combined results is 100.0%. This indicates an acceptable level of proficiency overall for the students completing the MES degree in chemical engineering.

The thesis and defense evaluation met the 75% benchmark. The overall faculty evaluation average was 3.44, indicating that students are successfully completing and communicating thesis work at an acceptable level.

All four communication and thesis-completion performance indicators achieved 100.0% proficiency. The lowest average scores were associated with indicators such as 4a, with an average score of 3.25. Continued attention to thesis significance, organization, presentation delivery, and question-and-answer performance remains appropriate.

Improvement Plan - SLO #4

Because the benchmark was met across all performance indicators, no major curriculum change is required based on the present results. However, the program should continue to strengthen thesis quality and oral communication expectations. To that end, the following improvement steps are proposed:

- Present the findings to department faculty to confirm that thesis committees continue to apply consistent expectations for thesis significance, organization, presentation, and question-and-answer performance.
- Encourage advisors to provide structured feedback on thesis organization and readiness before final defense.
- Continue emphasizing that students should clearly communicate the significance, methods, results, and limitations of their thesis work to a range of audiences.
- Maintain committee expectations for professional defense delivery and effective impromptu responses to questions.