

Building a Sustainable Culture of Assessment in MAE

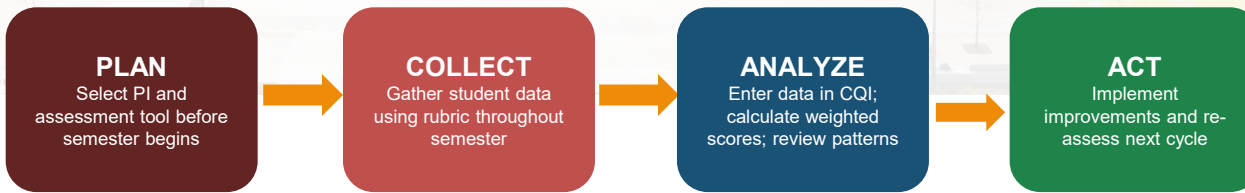
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Background and Context

Following the Fall 2023 ABET accreditation visit, the MAE department received feedback that our assessment system risked becoming unsustainable. Evaluators noted that Performance Indicators were not sufficiently measurable, and that too many Student Outcomes were assigned per course, making focused assessment difficult.

Dr. Xiyuan Liu led a five-member cross-program task force (ME and AE) to rebuild the department's assessment infrastructure. She brought national best practices from the 2024 ABET Symposium and translated them into structural, sustainable improvements across both programs.

Assessment Improvement Cycle



Key Initiatives (2023–2025)

- Revised all 9 ABET Student Outcomes and Performance Indicators — action-oriented, measurable language replacing passive wording
- Rebuilt CQI platform with auto-scoring, structured prompts, and distributed leadership across both program directors
- Developed 10+ discipline-specific assessment exemplars covering all 8 Student Outcomes
- Streamlined curriculum mapping: reduced SOs per course from 3–5 to 1–2 for more focused, meaningful data
- Integrated assessment into faculty retreats — culture shifted from compliance to evidence-informed reflection

ME Outcome Mapping – Proposed												
Year	Course	Semester	Level	1 Apply math and science	2 Design	3 Communication	4 Ethics	5 Teams	6 Experiment s Analyze and interpret Data	7 Lifelong Learning	8 Advanced math and numerical methods (ME Specific)	# of outcomes assessed
First-year	ECS101ME	Fall	*						X			0
First-year	ECS104	Spring	*							X		1
Sophomore	ECS326	Fall	*	X			X		X			2
Sophomore	ECS221	Fall	*	X					X			2
Sophomore	MAE284	Spring	*		X	X		X				3
Sophomore	MAE251	Spring	*	X								1
Sophomore	ECS222	Spring	*	X						X		1
Sophomore	ECS325	Spring	**	X							X	2
Junior	MAE315	Fall	**			X		X	X			3
Junior	MAE341	Fall	**	X								1
Junior	MAE312	Fall	**									0
Junior	MAE333	Fall	**									0
Junior	MAE322	Spring	**	X								1
Junior	MAE321	Spring	**							X	X	2
Junior	MAE355	Spring	**							X		1
Junior	MEE332	Spring	**	X	X							2
Senior	MEE431	Fall	**				X					1
Senior	MEE416	Fall	***	X					X			2
Senior	MEE471	Fall	***		X		X					2
Senior	MEE472	Spring	***			X		X		X		3
Senior	MAE530	Fall	***								X	1
Senior	MAE573	Fall	***								X	1
Senior	MAE571	Spring	***								X	1

Level	SO →	1	2	3	4	5	6	7	8
*	introduced	2	1	1	1	1	2	2	0
**	practiced	3	1	1	1	1	1	2	2
***	reinforced	1	1	1	1	1	1	1	3

Student Outcomes Assessed (2024–25)

SO1 Problem Solving | SO2 Design | SO3 Communication
SO4 Ethics | SO5 Teamwork | SO6 Experimentation
SO7 Lifelong Learning | SO8 Advanced Math (ME)
10 courses | 45 PI assessments | 71% on target (≥ 3.0 / 4.0)

Assessment Results (2024–2025)

10 ME courses submitted CQI data across Fall 2025 (21 PIs) and Spring 2025 (24 PIs). Using a 2.5/4.0 threshold:
32 (71%) on target | 10 (22%) watch zone | 3 (7%) below
Strongest results: MEE416 (SO1+SO6: 3.40–3.94), MAE573 (SO8: 3.57/3.74), ECS326 (SO4: 3.47–3.53), MAE355 (SO7: 3.94/3.98). Below threshold: ECS221 Shen SO1 (1.61), ECS222 Shen SO7 (2.35), ECS325 SO1 (2.38).

Closing the Loop: Actions Taken

ECS221 (SO1 = 1.61): Cross-section instructor coordination; 3D vector scaffolding added. Target ≥ 2.50.
ECS222 both sections (SO7 = 2.35/2.95): Statics–Dynamics coordination; FBD review added to ECS222.
ECS325 (SO1 = 2.38): AI-assisted homework policy implemented Spring 2025. ODE bridging module planned with MAE341.

Cultural Impact and Next Steps

Assessment is now embedded in academic planning. Faculty routinely discuss outcome data, curricular alignment, and improvement strategies — no longer viewed as an isolated accreditation task.
Fall 2026 Retreat: review re-assessment results, confirm curriculum coordination actions, and plan next cycle improvements.