Sustainable Energy Technology (BT)
Canino School of Engineering Technology
2019 Assessment Report

- Curriculum Coordinator: Dr. Kibria Roman
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SUNY CANTON

What was assessed? Student learning outcomes list:

- *PSLO 1*
  - An appropriate mastery of the knowledge, techniques, and skills, and modern tools of their disciplines utilizing renewable energy systems and design parameters

- *PSLO 2*
  - An ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology by applying these areas to renewable energy systems

What was assessed? Student learning outcomes list:

- *PSLO 8*
  - A recognition of the need for, and an ability to engage in lifelong learning.

- *PSLO 11*
  - A commitment to quality, timeliness, and continuous improvement.

What was assessed? Student learning outcomes list:

- *ISLO 5 -* Industry, Professional, Discipline-Specific Knowledge and Skills
  - The category of industry, professional, and discipline-specific knowledge and skills requires students to demonstrate the knowledge and skills necessary to succeed as leaders of tomorrow in their chosen career path.

Where were outcomes assessed?

- *PSLO 1-* Mastery of the knowledge, techniques, and skills, and modern tools

  AREA 320, AREA 370

- *PSLO 2 -* Apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology

  MECH 241, MECH 343

- *PSLO 8* - Lifelong Learning

  MECH 477

- *PSLO 11 – Commitment to quality, timeliness and c*ontinuous Improvement

  MECH 477

How was the assessment accomplished?

- Student work assessed:
  - Quizzes
  - Midterm and final exams
  - Group projects
  - Term papers

- Measurement strategy:
  - Applicable rubrics used for term papers and group projects
  - % of questions answered correctly on quizzes, HW and midterm/final exams
- Sample size:
  - All students who take the designated assessed courses, see attachment for N for each course

Assessment results: What have the data told us?

- **PSLO 1 –** Mastery of the knowledge, techniques, and skills, and modern tools
  - *AREA320(F19), Students demonstrate an understanding of experimental methodology, including statistics, error analysis, and uncertainty propagation.*
  - *70% of students demonstrate 70% competence*
  - *This will be evaluated in final exam in two sections: a)statistical analysis b) Uncertainty and error propagation.*

  - *FINDINGS:*
  - *100% of students achieved greater than 78.5% competence.*

Assessment results: What have the data told us?

- **PSLO 1 –** Mastery of the knowledge, techniques, and skills, and modern tools
  - *AREA370(S19), Students demonstrate an understanding of experimental methodology in different sustainable energy applications.*
  - *70% of students demonstrate 70% competence*
  - *This will be evaluated in three sections: a) Wind Turbine b) solar PV c) Geothermal measurement.*

  - ***FINDINGS:***
  - *Wind turbine lab:* 100% students got 85% or higher
  - *Solar PV pathfinder lab:* 100% students got 92% or higher
  - *Geothermal heat exchanger lab:* 100% students got 83% or higher.

Assessment results: What have the data told us?

- ***PSLO 3 –***Apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology
    - *– **MECH 343 (S19**) Term project where students will implement the knowledge of mathematics, science, engineering, and technology in either designing an experiment or conduct a simulation project*
    - *– 70% of students demonstrate 70% competence*
    - *– This will be evaluated in either in a) Experimental project b) Simulation project*

    FINDINGS:
    - – 100% students got 87% or higher

Assessment results: What have the data told us?

- ***PSLO 3 –*** *Apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology*
  - ***MECH 241 (F19****) Design a photovoltaic/hydropower off-grid system for residential house*
  - *70% of students demonstrate 70% competence*
  - *This will be evaluated in either in a) Experimental project b) Simulation project*

  FINDINGS:
  - 18% students got 70% or higher. Not met
  - The assignment is a practical application of the course content in terms of sustainable energy storage. A different version of the handout should be made that asks for short responses that specifically ask for comparisons to other method of storing energy and the selection of the most feasible option. That should assess the last two rows on the rubric.

Assessment results: What have the data told us?

- **PSLO 8 – Lifelong Learning**
  - **MECH477(S19)** *Observing and reading their life-long learning at the end of the semester*
  - *Comment on their life-long learning.*
  - **FINDINGS:**
  - Some groups did these and was very useful. Others did not. Target met.

Assessment results: What have the data told us?

- **PSLO 11 – Commitment to quality, timeliness, and continuous improvement**
  - *MECH477(S19), Student final report is used to accessed this student outcome*
  - *Each group will score 70% or higher*

  FINDINGS:
  - *1 group did well…others did not, NOT MET*
  - Couple of things was suggested to start in MECH 377 are paper portfolios and the design report. Student report writing and format needs a bit more work. For portfolio students may use the binder template from Dr. Craig.

Data-driven decisions: How the program has or plans to "close the loop" based on these results.

– Continue to revise the course curriculum to better align with the program's objectives according to the SLO outcomes

– Continue to revise the related courses to better align with the student learning outcomes

– Advise students in the program to seek for additional instructional support when needed, e.g. tutoring.

Data-driven decisions: How the program has or plans to "close the loop" based on these results.

– Continue to map courses and outcomes in Taskstream so the software can assist with this process better

Data-driven decisions: How the program has or plans to "close the loop" based on these results.

- 3rd semester students (MECH241 assessment comments) are lacking in analytical capability stems from weak foundational learning in the student's respective engineering classes. Despite being discussed as an expectation for the homework in the class, the comparisons to the other methods of storing energy and selecting the most feasible option were not completed by any students. I would suggest that students be instructed on analytical capabilities on exploring engineering problems in a more critical fashion.

What resources were used or have been requested to close the loop?

– AREA 370 – Experimentation and measurement lab needs a new fuel cell and battery testing setup.

Attachments: 2019 SLO Findings

PSLO 1– Mastery of the knowledge, techniques, and skills Assessment Findings Data

PSLO 1

An appropriate mastery of the knowledge, techniques, and skills, and modern tools of their disciplines utilizing renewable energy systems and design parameters

	Measures	Not Met		MET		Exceeded		No Findings	
	N	N	%	N	%	N	%	N	%
All Courses	2					2	100		
AREA 320	1					1	100		
AREA 370	1					1	100		

PSLO 3– Apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology Assessment Findings Data

PSLO 3

An ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology by applying these areas to renewable energy systems

	Measures	Not Met		MET		Exceeded		No Findings	
	N	N	%	N	%	N	%	N	%
All Courses	2	1	50			1	50		
MECH 343	1					1	100		
MECH 241	1	1	100						

PSLO 8–Lifelong learning.
Assessment Findings Data

PSLO 8

A recognition of the need for, and an ability to engage in lifelong learning.

	Measures	Not Met		MET		Exceeded		No Findings	
	N	N	%	N	%	N	%	N	%
All Courses	1			1	100				
MECH 477	1			1	100				

PSLO 11– Commitment on quality, timeliness and continuous improvement

PSLO 11

A commitment to quality, timeliness, and continuous improvement.

	Measures	Not Met		MET		Exceeded		No Findings	
	N	N	%	N	%	N	%	N	%
All Courses	1	1	100						
MECH 477	1	1	100						