NEW YORK INSTITUTE OF TECHNOLOGY

Continuous Program Improvement (CPI)

Student Learning Outcomes (SLO)/Program Learning Outcomes (PLO)

Plan Implementation Report - AY 2023-24

Program name	Mechanical Engineering
Expected date of submission	6/30/2024
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Dean's signature	

New York Tech's CPI process is implemented to meet Middle States Commission on Higher Education (MSCHE) Standard V: *Educational Effectiveness Assessment*, which states: "Assessment of student learning and achievement demonstrates that the institution's students have accomplished educational goals consistent with their program of study, degree level, the institution's mission, and appropriate expectations for institutions of higher education."

Each department was asked to create a three-year assessment/evaluation plan to improve student learning for ***each of their degree programs*** covering the following academic years: **2022-2023, 2023-2024, and 2024-2025.**

All degree programs' three-year Program Learning Outcomes (PLO) plans are available here: http://www.nyit.edu/planning/academic_assessment_plans_reports

This is a report on the PLO CPI plan **implementation** for the **2023-24** academic year.

First, please respond to the feedback provided by the CPI Committee in response to your program's prior year (AY 2022-23) CPI plan implementation report. How did you incorporate the Committee's recommendations into your CPI efforts?

The CPI committee suggested to summarize next steps in the "Close the Loop" section, and providing an action plan with regard to the recommendations of improvement and reassess these recommendation's effectiveness. Just to clarify, when each faculty member do the FCARs for their course learning outcome assessment, it is a closed-loop process. Each faculty will summarize their findings during the course and identify shortcomings, and more importantly, address them by improvements in the next term. Therefore, each course already had all of those recommended elements. The program outcome is summary of all individual courses, thus has all of them embedded in the assessment as well.

Second, please address the following points in this year's (AY 2023-24) report:

1. Program learning outcomes assessed
   List the program learning outcomes that were assessed in AY 2023-24 based on your three-year plan (2022-25). *(Please refer to the guidelines for articulating expected program learning outcomes.)*

   As this program is accredited by ABET, we access the learning outcomes following ABET guideline which requires the assessment of a set of (1)-(7) Student Outcomes (SOs):

   1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
   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
   3. an ability to communicate effectively with a range of audiences
   4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
   5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

2. Methods

Describe the method of assessment that you used (student artifacts, sampling methods, sample size, who and how they were assessed, etc.) and attach measurement instruments (e.g., rubrics, exam items, scoring guide for a particular task, supervisor evaluation form, survey instrument, and other measurement tools). Remember: direct assessment is required, and both direct and indirect assessment are strongly recommended.
(Please refer to the guidelines for assessment methods.)

The assessment is based on Faculty Course Assessment Reports (FCARs) which are submitted by the faculty for each course they teach during the academic year. The FCAR requires:

- The faculty member to identify course-specific learning outcomes (LO's) for his/her course and to establish appropriate performance tasks (APTs) with appropriate documentation to assess to what extent the Student Outcomes are being met. These APTs may be quizzes, exam questions, reports, projects, presentations, etc. Each student's APT is then scored with the method shown below (Table 1), to create an EGMU vector for that specific Student Outcome and a corresponding assessment metric.
- Each faculty member must satisfy a minimum set of Student Outcomes (1 - 7) for his/her course as established by the department. This is accomplished by using a subset of the Appropriate Performance Tasks (APTs) to satisfy the COs. Here the faculty member is required to show what part of each task is being used to form a metric for the Student Outcomes (1 – 7) with appropriate documentation. To accomplish this task, the department formulated a set of criteria for each Student Outcome (1 – 7) that can be used as a guiding rubric to explain and help faculty evaluate what that outcome requires for an EGMU score of 3 (or "Excellent"). EGMU scores of 2, 1, and 0 represent partial satisfaction of the rubric.

  The department has determined that the minimum level of quality that it felt was necessary in order to produce graduates that will ultimately achieve our Program Educational Objectives is **an EGMU score of 2.0 for each Student Outcome**. This score of 2.0 was chosen by the department because in the EGMU score of 2.0 indicates Good and therefore represents what a student would need in order to satisfy the requirements for graduation.

3. Analyze and interpret assessment data

It is strongly recommended to provide criteria-based analyses of assessment results and based on the analysis to determine if students are meeting the expected learning outcomes.

(Please refer to the guidelines for compiling, analyzing and interpreting assessment data).

The table below shows the EGMU values of the Student Outcomes 1-7:

Outcome #	E	G	M	U	Average
1	393	289	173	160	1.901477
2	43	72	10	8	2.127819
3	20	49	7	3	2.088607
4	34	64	6	4	2.185185
5	34	64	6	4	2.185185
6	31	49	6	4	2.188888
7	34	64	6	4	2.185185

4. Close the Loop

   If the expected program learning outcomes were successfully met, describe how the program will keep or expand the good practices. If they were not successful, explain how you have or will refine the plan and begin the next cycle of Plan-Do-Study-Act (PDSA).

   (Please refer to the guidelines for closing the loop and taking action to improve program learning outcomes.)

   Overall, the Student Outcomes scores are good (generally above 2.0, except Outcome #1 is a little below 2). Generally, faculty members felt the students were not very well prepared in the math courses (which was likely due to the ineffective learning during the CoVID pandemic years).

   As mentioned above, the FACR assessment process is naturally a continuous improvement process. Each faculty will summarize their findings during the course and identify shortcomings, and more importantly, address them by improvements in the next term.

5. Describe how faculty were involved in the implementation of the PLO CPI plan and how the results will be communicated to all stakeholders.

   All faculty members are engaged in the annual assessment as all faculty members are required to submitted the FCARs for the courses they taught.