

**Continuous Program Improvement (CPI)
Student Learning Outcomes (SLO)/Program Learning Outcomes (PLO)
Plan Implementation Report - AY 2023-24**

Program name	
Expected date of submission	6/30/2024
Department chair/program director	Giovanni Meloni
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?

We thank the committee for their feedback on our report. We did not receive any recommended actions for program improvement or additional constructive feedback (points 9 and 11) in the Committee's recommendations. In that light we will continue to innovate our program to achieve the best results for our students.

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](#).)

LO#3 Synthesize, isolate, separate, identify, quantify, and characterize molecules.

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](#).)

Ninety-two students from both campuses taking CHEM-250 in the Spring of 2023 were assessed on LO#3 using a quiz on the topics covered as a laboratory experiment: nitration of methyl benzoate. In this experiment, students synthesized methyl 3-nitrobenzoate by nitration of methyl benzoate. They purified the molecule using the recrystallization technique and identified it by melting point.

After students completed the laboratory experiment and discussions, a quiz (5 questions, 15 minutes) was used to evaluate the students during a lecture class.

The quiz is reported below. The correct answers are highlighted in yellow.

QUIZ: Nitration of Methyl Benzoate Laboratory

Q1. Which of the following is the major product of the nitration of methyl benzoate?

PLO#3: synthesis of molecules

- A. methyl 2-nitrobenzoate
- B. methyl 3-nitrobenzoate
- C. methyl 4-nitrobenzoate
- D. methyl 2,6-dinitrobenzoate

Q2. In the nitration of methyl benzoate, which technique is used to isolate the pure product?

PLO#3: Isolate molecules

- A. Distillation
- B. Crystallization
- C. Melting point
- D. Column chromatography

Q3. If the product of the nitration of methyl benzoate (m.p. = 78°C) is not completely dry, its melting point will

PLO#3: identify molecules

- A. be higher than 78°C and broader.
- B. be lower than 78°C and broader.
- C. remain the same.
- D. be higher than 78°C and sharper.
- E. be lower than 78°C and sharper.

Q4. What is the role of H₂SO₄ in the nitration of an aromatic compound?

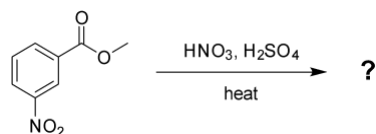
PLO#3: synthesis of molecules, understanding mechanism

- A. Activation of the aromatic ring

- B. Deactivation of the aromatic ring
- C. Dehydration of nitric acid to produce nitronium ion (NO_2^+)
- D. Hydration of nitric acid to produce nitronium ion (NO_2^+)

Q5. What would be the major product of the following nitration reaction?

PLO#3: synthesis of molecules



- A.
- B.
- C.
- D.
- E.

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 results of the quiz are attached as an Excel file. In summary, more than 80% of the students answered correctly questions Q1 (86.96%), Q2 (93.48%), and Q5 (88.04%). Considering a target of 80% of students achieving standard (level 3), these results indicate that the students are meeting the expected learning outcomes. Question Q4 was answered correctly by 77.83% of students. This result is unacceptable and indicates a lack of understanding of the mechanism of the reaction.

Regarding question Q3, 66.3% of students could answer correctly. This question assessed the ability of the students to analyze data and draw appropriate conclusions based on their experimental observations. This specific outcome was not successfully achieved.

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](#).)

Students achieved a standard of success, as more than 80% answered correctly 3 out of 5 questions of the quiz on the nitration of methyl benzoate. This standard of success is based on our program's learning objectives and the expected level of understanding of these topics. Students learn and apply these topics in the lecture and laboratory classes. Such an approach is successful and will be continued in the chemistry program.

On the other hand, we have identified a specific area for improvement. The poor learning outcome observed for question Q3 was due to some laboratory sections not completing the experiment. This highlights the crucial role of practical sessions in our program. These sessions are necessary for a comprehensive understanding of the topics. Our implementation plan will ensure that all laboratory instructors have a detailed list of learning outcomes for each laboratory class, reinforcing the value of these sessions.

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

Faculty members teaching the course identified the best method of assessment and way to implement the assessment. Data analysis was conducted by each instructor and results were pooled and analyzed by the group of instructors. The results of these analyses will be communicated to all stakeholders through reports such as this one, faculty retreats, and monthly faculty meetings.