

ASSESSMENT REPORT 2022-2023

Chemistry Undergraduate
(Instructional Degree Program)

B.S./B.A.
(Degree Level)

Program Mission:

The goal of the chemistry Bachelor of Science degree program is to adequately instruct and engage the students with chemistry inside and outside of the department. The program is designed to prepare students for the rigors of a more advanced M.S. or Ph.D. program of study or direct entrance into the workforce. Course preparation and advisement are also available for students who choose to enter a professional school to study for a career in an area such as medicine, veterinary science, dentistry, pharmacy, etc..

Student Learning Outcome 1:

NMHU Bachelor of Science Chemistry students should have the command of a basic body of chemical knowledge that is competitive with B.S. level chemistry students from any quality US University or institution.

NMHU Traits Specifically Linked to Student Learning Outcome 1

- Mastery of Content Knowledge and Skills

First Means of Assessment for Outcome 1:

The American Chemical Society produces standardized entrance examinations for general, organic, analytical chemistry, biochemistry, and physical chemistry. These examinations allow the faculty to compare the competence of our students with those at other institutions. Student outcomes are considered met if students score within one standard deviation of the average of the National Raw Score Composite Norms for any particular ACS subject exam. The program goal will be considered met if the percentage of students meeting this criteria is greater than 60%. Below are results based on a ACS General Chemistry Exam.

Summary of Data:

Number of Students Meeting Criterion:	2	Number of Students Not Meeting Criterion:	4
Total Number of Students Assessed:	6	Percent of Students Meeting Criterion:	33%

Interpretation of Results for Outcome 1:

The percentage of students meeting the criterion was well below target. However, this is consistently one of the criteria that is hardest to meet in our assessment, and the program continues to assess new methods for increasing student success on ACS tests. This includes SIL, supplemental tutoring sessions, study guides, etc.

In this assessment period the Chemistry department had an unusually low number of undergraduate students, compared to previous years. Small sample sizes mean that even small numbers of students not meeting the criteria make our thresholds difficult to meet. It was also noted that the education level of the students was lower than usual, which might have been a result of the COVID 19 pandemic.

Student Learning Outcome 2:

NMHU Bachelor of Science Chemistry students should be able to analyze chemical problems and communicate appropriate solutions to the problem that utilize appropriate chemistry-related instrumentation.

NMHU Traits Specifically Linked to Student Learning Outcome 2

- Mastery of Content Knowledge and Skills
- Effective Communication Skills
- Critical and Reflective Thinking Skills

First Means of Assessment for Outcome 2:

A capstone course, Chemistry 4950, Senior Chemistry Applications, consists of an open-ended advanced chemistry project and a series of oral and written examinations that are designed to reveal each student's overall understanding of chemistry. Student outcomes are considered met if students score a "B" or better for the capstone course. The program goal is considered met if the percentage of students meeting this criteria is greater than 90%.

Only one student was signed for this class in the 2022/23 academic year.

Summary of Data

Number of Students Meeting Criterion:	1	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	1	Percent of Students Meeting Criterion:	100%

Second Means of Assessment for Outcome 2:

Involvement of students in research projects allows the faculty to ascertain student achievement in the areas instrumentation usage, safety, problem solving, project completion abilities and the utilization of basic chemical knowledge. Student outcomes are considered met if students engage in research and present their findings at professional meetings, department seminars, or the NMHU Student Research Day. The program goal will be considered met if the percentage of students meeting this criterion is greater than 50%.

Summary of Data:

Number of Students Meeting Criterion:	4	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	4	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 2:

Both criteria were met. In our case, there were no students who did not meet the criteria, which is a good rate for this program.

The engagement of our students in research and presentation of their projects should be a strength in the chemistry program. We will continue to improve it as new faculty expands their research programs and begins to take in more students.

Student Learning Outcome 3:

NMHU Bachelor of Science Chemistry students should be engaged with chemistry outside of the classroom.

NMHU Traits Specifically Linked to Student Learning Outcome 3

- Effective Communication Skills
- Critical and Reflective Thinking Skills

First Means of Assessment for Outcome 3:

The Chemistry Seminar class 4550 is a weekly opportunity for students to experience speakers from within the department as well as invited speakers from other institutions and laboratories. Attendance at these seminars is not required, but is a vital piece of the program's goal of engagement. This outcome is considered met if students (sophomore-senior) attend at least one seminar per academic year. The program goal

will be considered met if the percentage of students meeting this criteria is greater than 60%.

Assesment on this criteria could not be conducted because the Chemistry Seminar class 4550 was not offered in the academic year 2022/2023.

Second Means of Assessment for Outcome 3:

Research projects are another means for the program to extend chemical education outside of the classroom. This outcome is considered met if Junior and Senior students are involved in research projects with the Chemistry Faculty. The program goal will be considered met if the percentage of students meeting this criterion is greater than 75%.

Summary of Data

Number of Students Meeting Criterion:	4	Number of Students Not Meeting Criterion:	2
Total Number of Students Assessed:	6	Percent of Students Meeting Criterion:	67%

Interpretation of Results for Outcome 3:

Because the Chemistry Research seminar was not offered during the 2022/23 academic year only the second part of Outcome 3 could be assessed. Two of the six assessed students did not participate in research projects with the Chemistry Faculty. Therefore only 67 % of the students met the criteria. The program goal was not achieved for Outcome 3. This reporting period was overshadowed by the leaving of faculty. We strive to improve the situation by stimulating more involvement of students in projects that are now offered by the newly hired faculty.

Student Learning Outcome 4:

NMHU Bachelor of Science Chemistry graduates should be fully prepared to further their education in chemistry or related fields.

NMHU Traits Specifically Linked to Student Learning Outcome 4

First Means of Assessment for Outcome 4:

This outcome is considered met if graduating seniors submit an application for further education in chemistry or a related field (e.g. M.S. or Ph.D programs in chemistry, professional schools, etc.). The program goal will be considered met if the percentage of students meeting this criterion is greater than 75%.

Summary of Data

Number of Students Meeting Criterion:	6	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	6	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 4:

Although the criterion was fully met, the Chemistry faculty agrees that this criterion should be modified in the future to include students who entered the workforce.