AC 2019 – 2020 Assessment

Bachelor of Science in Physical Science

College: Arts and Sciences

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Northwestern Mission. Northwestern State University is a responsive, Student-oriented institution that is committed to the creation, dissemination, and acquisition of knowledge through teaching, research, and service. The University maintains as its highest priority excellence in teaching in graduate and undergraduate programs. Northwestern State University prepares its Students to become productive members of society and promotes economic development and improvements in the quality of life of the citizens in its region.

College of Arts and Sciences' Mission. College of Arts and Sciences' Mission. The College of Arts & Sciences, the largest college at Northwestern State University, is a diverse community of scholars, teachers, and students, working collaboratively to acquire, create, and disseminate knowledge through transformational, high-impact experiential learning practices, research, and service. The College strives to produce graduates who are productive members of society equipped with the capability to promote economic and social development and improve the overall quality of life in the region. The College provides an unequaled undergraduate education in the social and behavioral sciences, English, communication, journalism, media arts, biological and physical sciences, and the creative and performing arts, and at the graduate level in the creative and performing arts, English, TESOL, and Homeland Security. Uniquely, the College houses the Louisiana Scholars' College (the State's designated Honors College), the Louisiana Folklife Center, and the Creole Center, demonstrating its commitment to community service, research, and preservation of Louisiana's precious resources.

School of Biological and Physical Sciences. The School of Biological and Physical Sciences will become a reputable leader in public higher education by providing a transformative science educational experience using innovative instructional methods and through the scholarly achievements of our faculty, staff, students, and alumni. The School serves and inspires the students of Northwestern State University and the public through the development of lifelong learners who are excited about science, are disciplined in analytical and critical thinking skills, and are socially, environmentally, and ethically responsible. The School delivers Associate degrees in Veterinary Technology, Bachelor of Science degrees in Biology (with concentrations in Biomedical, Clinical Laboratory Science, Forensic Science, Natural Science, and Veterinary Technology), Applied Microbiology (with concentrations in Environmental and Applied Microbiology and Medical and Health Profession), and Physical Sciences. The School also offers minors in Biology, Microbiology, Wildlife Management, and Chemistry.

Physical Science Program Mission Statement. The mission of the Northwestern State University Physical Science program is to provide a comprehensive education in

chemistry and physics for all of our majors and to create a unique training environment for students wishing to pursue graduate or professional education.

Purpose (optional): The primary goal of the Physical Science program is to prepare students to enter the job market competitively at the bachelor level or to further their education in either graduate or professional school.

Methodology: The assessment process for the Physical Science program is as follows:

(1) Data from assessment tools (both direct – indirect, quantitative and qualitative) are collected and returned to the program coordinator.

(2) The program coordinator will analyze the data to determine whether students have met measurable outcomes.

(3) Results from the assessment will be discussed with the program faculty.

(4) The program coordinator, in consultation with the director of the School of Biological and Physical Sciences as well as the faculty of the School, will propose changes to measurable outcomes and/or assessment tools for the next assessment period and, where needed, curricula and program changes.

Student Learning Outcomes:

NOTE: The Bachelor of Science in Physical Science is a relatively new program with low enrollment (only four declared majors during the Spring 2019 semester). Therefore, data collection was limited to only three students who took a required, major course.

SLO 1. Students will identify the basic components of the atomic structure.

Course Map: CHEM1030 – General Chemistry I. All majors are required to complete CHEM1030.

Measure 1.1. (Direct – knowledge)

Throughout the course, students will learn the structure of atoms and the importance of each subatomic particle. Each student is required to pass a quiz covering these concepts. The target is to have 75% of students attain a quiz grade of ≥70%.

Findings: N/A

Analysis: In AC 2018-2019 the target was met. This suggested that informational delivery in CHEM1030 provided students with the appropriate knowledge to meet the target of 75% of students attaining a quiz grade of ≥70%. In AC 2019 – 2020, there were no Physical Science students in to assess CHEM 1030.

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Decision: Based on the lack of students in AC 2019-2020, the faculty will revise the courses mapped to this measure.

Measure 1.2. (Indirect – survey)

At the end of the course, a survey is administered to students to gauge their appraisal of their understanding of the basic concepts of atomic structure covered in the course. The target is to have 75% of the students report an above average or excellent knowledge of the indicated concepts.

Findings: N/A.

Analysis: In AC 2018-2019 the target was met. This suggest that Informational delivery in CHEM1030 provided students appropriate knowledge to meet the target of 75% of students reporting an above average or excellent understanding of atomic structure and the importance of subatomic particles. In AC 2019 – 2020, there were no Physical Science students to assess in CHEM 1030.

Decision: Based on the lack of students in AC 2019-2020, the faculty will revise the courses mapped to this measure.

SLO 2. Students will be able to classify the various types of atomic bonding.

Course Map: CHEM1030 – General Chemistry I. All majors are required to complete CHEM1030.

Measure 2.1. (Direct – knowledge)

Throughout the course, students will learn about the various types of atomic bonding and the significance of each type. Each student is required to pass a quiz covering these concepts. The target is to have 75% of students attain a quiz grade of ≥70%.

Findings: N/A.

Analysis: In AC 2018-2019 the target was met. This result suggested that the informational delivery in CHEM1030 provided students with appropriate knowledge to meet the target of 75% of students attaining a quiz grade of ≥70%. In AC 2019 – 2020, there were no Physical Science students to assess in CHEM 1030.

Decision: Based on the lack of students in AC 2019-2020, the faculty will revise the courses mapped to this measure.

Measure 2.2. (Indirect – survey)

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At the end of the course, a survey is administered to students to gauge their appraisal of their understanding of the basic concepts in atomic bonding covered in the course. The target is to have 75% of the students report an above average or excellent knowledge of the indicated concepts.

Findings: N/A.

Analysis: In the AC 2018-2019 the target was not met. This result suggested that the informational delivery in CHEM1030 does not provide students with appropriate knowledge to meet the target of 75% of students reported an above average or excellent understanding of the various types and significance of atomic bonds. In AC 2019 – 2020, there were no physical science students to assess in CHEM 1030.

Decision: Based on the lack of students in AC 2019-2020, the faculty will revise the courses mapped to this measure.

SLO 3. Students will define different properties of solution chemistry.

Course Map: CHEM1030 – General Chemistry I and CHEM1040 – General Chemistry II. All majors are required to complete CHEM1030 and CHEM1040.

Measure 3.1. (Direct – knowledge)

Throughout the courses, students will learn about solution chemistry. Each student is required to pass a quiz covering these concepts. The target is to have 70% of students attain a quiz grade of ≥70%.

Findings: N/A.

Analysis: In the AC 2018-2019 the target was not met. This result suggested that informational delivery in CHEM 1030 does not provide students with appropriate knowledge to meet the target of 70% of students attaining a quiz grade of ≥70%. In AC 2019 – 2020, there were no physical science students to assess in CHEM 1030 and 1040.

Decision: Based on the lack of students in AC 2019-2020, the faculty will revise the courses mapped to this measure.

Measure 3.2. (Indirect – survey)

At the end of the courses, a survey is administered to students to gauge their appraisal of their understanding of the basic concepts of solution chemistry covered in the course. The target is to have 75% of the students report an above average or excellent knowledge of the indicated concepts.

Findings: N/A

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Analysis: In AC 2018-2019 the target was not met. This result suggested that informational delivery in CHEM 1030 does not provide students with appropriate knowledge to meet the target of 75% of students reported an above average or excellent understanding of solution chemistry. In AC 2019 – 2020, there were no physical science students to assess in CHEM 1030 or 1040.

Decision: Based on the lack of students in AC 2019-2020, the faculty will revise the courses mapped to this measure.

SLO 4. Students will use numerical data to perform chemical calculations.

Course Map: CHEM1030 – General Chemistry I and CHEM1040 – General Chemistry II. All majors are required to complete CHEM1030 and CHEM1040.

Measure 4.1. (Direct – knowledge)

Throughout the courses, students will learn about chemical calculations. Each student is required to pass quizzes covering these concepts. The target is to have 70% of students attain a quiz grade of ≥70%.

Findings: N/A.

Analysis: The target was met in AC 2018-2019. This result suggested that informational delivery in CHEM 1030 provided students with appropriate knowledge to meet the target of 70% of students attaining a quiz grade of ≥70%. In AC 2019 – 2020, there were no physical science students to assess in CHEM 1030 or 1040.

Decision: Based on the lack of students in AC 2019-2020, the faculty will revise the courses mapped to this measure.

Measure 4.2. (Indirect – survey)

At the end of the courses, a survey is administered to students to gauge their appraisal of their understanding of the basic concepts of chemical calculations covered in the course. The target is to have 75% of the students report an above average or excellent knowledge of the indicated concepts.

Findings: N/A.

Analysis: The target was met in AC 2018-2019. This result suggested that informational delivery in CHEM 1030 provided students with appropriate knowledge to meet the target of 75% of students reporting an above average or excellent understanding of the usage of numeric data to perform chemical calculations. In AC 2019 – 2020, there were no physical science students to assess in CHEM 1030 or 1040.

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Decision: Based on the lack of students in AC 2019-2020, the faculty will revise the courses mapped to this measure.

SLO 5. Students will apply critical thinking in the analysis of the periodic table elemental trends.

Course Map: CHEM1030 – General Chemistry I and CHEM1040 – General Chemistry II. All majors are required to complete CHEM1030 and CHEM1040.

Measure 5.1. (Direct – knowledge)

Throughout the courses, students will learn about the periodic table and how the different groupings are used to name chemical compounds. Each student is required to pass quizzes covering these concepts. The target is to have 70% of students attain a quiz grade of ≥70%.

Findings: N/A.

Analysis: The target was met in AC 2018-2019. This result suggested that informational delivery in CHEM 1030 provided students with appropriate knowledge to meet the target of 70% of students attaining a quiz grade of ≥70%. In AC 2019 – 2020, there were no physical science students to assess in CHEM 1030 or 1040.

Decision: Based on the lack of students in AC 2019-2020, the faculty will revise the courses mapped to this measure.

Measure 5.2. (Indirect – survey)

At the end of the courses, a survey is administered to students to gauge their appraisal of their understanding of the basic concepts the periodic table and how the different groupings are used to name chemical compounds covered in the course. The target is to have 75% of the students report an above average or excellent knowledge of the indicated concepts.

Findings: N/A.

Analysis: The target was not met in AC 2018-2019. This result suggests that informational delivery in CHEM 1030 does not provide students with appropriate knowledge to meet the target of 75% of students reported an above average or excellent understanding of periodic table elemental trends. In AC 2019 – 2020, there were no physical science students to assess in CHEM 1030 or 1040.

Decision: Based on the lack of students in AC 2019-2020, the faculty will revise the courses mapped to this measure.

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Comprehensive summary of key evidence of improvements based on analysis of results.

As a result of the findings of AC 2019-2020, several changes were implemented to improve student performance. More specifically, the Director:

- Encouraged faculty to use more active learning exercises/approaches to informational delivery.
- Some targets were increased to further challenge the students' performance on some assessments.
- Encouraged faculty spent more instructional time on the concepts

As a result of these changes, no improvements were measured because there were no Physical Science students to assess in CHEM 1030 or 1040 in AC 2019 – 2020.

Plan of action moving forward.

To improve the program for AC 2020 – 2021 the director and faculty will implement the following changes to instruction and classes:

The faculty will revise the courses mapped to this measure to better capture physical science majors.