

Academic Programs

Annual Program Assessment Report: 2018-2019

School: Arts and Sciences

Department: Chemistry

Program: Pharmaceutical Science (BS)

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- I. **Program Mission:** The Pharmaceutical Sciences major provides students with the fundamental scientific and technical skills required to work in pharmaceutical and biotechnological industries or for post-graduate studies in pharmacy and related advanced professional trainings. In addition to the core competencies in organic, physical and analytical chemistry, biochemistry and instrumentation (common to the Chemistry major), the Pharmaceutical science major acquires specific competences and fundamental knowledge in pharmaceutics, pharmaceutical manufacturing, pharmacology and regulatory affairs over the course of their four-year plan.

- II. **ASSESSMENT ACTIVITIES:** Please complete the table below, add rows as needed.

| Institutional Learning Outcomes (ILOs) | Program Goals | Program Level Student Learning Outcomes (PSLOs) | Course(s), Section(s), N=Sample Size | Measure ¹ & Expected Level of Students' Achievement | Findings | Use of Results |
|---|---|--|--------------------------------------|--|---|---|
| Intellectual Discovery & Creativity: Demonstrate excellence in academic inquiry, creativity, research, collaboration and professional growth. | Goal #_3__ Students will acquire fundamental knowledge of pharmacokinetics principles and basic understanding of the mechanisms of action of the major classes of therapeutic drugs. | #_3.1____ Students will explain pharmacokinetics, dose-response relationships, and receptor binding. | PHS 401: 7 students | Students will score over 70% | There was no lesson tested on this learning outcome | Changes needed: No Type of change: Click here to enter text. |
| | | #_3.2____ Students will describe the therapeutic uses and routes of administration of the major class of drugs. | PHS 401: 8 students | Students will get over 70% | 5 over 70% and 3 failed to achieve 60% | Changes needed: No Type of change: Click here to enter text. |

¹ Direct measure is required; indirect measure is optional. E.g. Direct: Exams, assignments, presentations, etc. Indirect : Survey, focus groups, etc.

| | | | | | | |
|---------------------------|---------------------------|--|---------------------|----------------------------|---|---|
| Click here to enter text. | Click here to enter text. | #_3.3____ Students will illustrate the mechanism of action of the major classes of drugs at the cellular, organ and organ-system level. Click here to enter text. | PHS 401: 7 students | Students will get over 70% | <p>The outcome for Goal #3 for PHS 401 (Test 3 during Spring 2019 Semester)</p> <p>7 students over 70% and none failing to achieve 60%</p> <p>The outcome for Goal #3 for PHS 401 (Final Spring 2019 Semester)</p> <p>3 students over 70% and 4 students failing to achieve 60%</p> | Changes needed: Yes Type of change: Toward the end of the semester, students should be provided with more cumulative final exam support. |
|---------------------------|---------------------------|--|---------------------|----------------------------|---|---|

- III. **Data Collection and Analysis:** Based on the information above, what do the findings suggest? Describe how and when the data was collected and analyzed for each of the student learning outcome. Describe what tools were used to evaluate student work, e.g. rubrics. **Please attach rubrics used and identify level (program/course embedded).** Describe how interrater reliability was established, including number of faculty involved in the processes.

The Pharmaceutical Science program used the Chemistry Department rubric that breaks down the outcomes into four categories for all types of assessment situations such as multiple choice, true-or-false, calculation, chemical structure, apparatus, open-end mechanisms, etc.: 1) Exemplary/Master; 2) Acceptable/Developing; 3) Poor/Approaching; and 4) Attempted/Emerging. As shown on the attached rubric, the committee members graded the Mastery level answers 5 out of 5; 100 out of 100; and so on.

The Pharmaceutical Science curriculum includes a big portion of foundational and core chemistry courses. For the assessment of the pharmaceutical portion, PHS 401 was selected to assess the PG #3: Students will acquire fundamental knowledge of pharmacokinetics principles and basic understanding of the mechanisms of action of the major classes of therapeutic drugs. According to the curriculum map, PHS 401 students acquire fundamental knowledge pharmacokinetics principles and basic understanding of the mechanisms of action of the major classes of therapeutic drugs. In this assessment, the committee has decided to take data from the midterm and final exam of PHS 401 in order to evaluate the students' progress. Since there was no lesson to test in this assessment period, there is no present data for PSLO 3.1. In PSLO 3.2, students will describe the therapeutic uses and routes of administration of the major class of drugs. In PHS 401, 5 out of 8 students achieved over 70%; however, 3 out of 8 students failed to achieve 60%. Last semester, 5 out of 8 students achieved over 70%; however, in the previous academic year, 10 out of 12 students achieved over 70%.

In PSLO 3.3, students will illustrate the mechanism of action of the major classes of drugs at the cellular, organ and organ-system level. In Test 3, all students have achieved over 70%. However, in the final exam, 3 out of 7 students achieved over 70%, while 4 out of 7 students failed to achieve 60%. In comparison to Test 3, the final exam performance shows a decline. Although it is a common trend for students to not achieve as highly in the final exam as in the midterm exams, students should be given cumulative support to help them strongly reinforce the full class content.

Although the data shows that the course is effective, the students appear to show a decline in their learning process for the final exam. One attribution for the outcome can fall into the style of the questions for the assessment. However, the department should continue to work on areas that change was attempted.

- IV. **Action Plan:** Based on the information provided above in *Use of Results* section, describe the next steps that will be taken to ensure that the changes indicated above are actually implemented. If no changes are needed, explain why.

Regarding PSLOs 3.1 and 3.2, no necessary changes were advised because there was no lesson taught on the learning outcome of 3.1; the majority of PHS 401 students have met the goal for 3.2.

Regarding PSLO 3.3, students of PHS 401 have shown a decline in performance from Exam 3 to

the final exam. As a result, it is suggested that toward the end of the semester, all students should be provided with more cumulative final exam support.

- V. **Communication:** Indicate to whom, how and when the assessment results will be (or have been) communicated to internal and external stakeholders.

The assessment results will be communicated with faculty members in the department meetings. Then, the results will be posted on a website at a departmental and/or college level.

For the 2019-2020 academic year, PSLO 2.1 (students will explain fundamental knowledge of the regulatory aspects of the pharmaceutical manufacturing processes) will be assessed again in PHS 300 and 350 through the in-class exams. PSLO 2.2 (students will explain the various stages of drug development and discovery, from the identification of potential molecules to the marketing of the final product) will be assessed in PHS 300, PHS 301, and PHS 350 through in-class exams. PSLO 2.3 (students will explain and apply US laws regarding the development and marketing of drugs) will assess PHS 300 and PHS 350 through in-class exams. PSLO 2.4 (students will explain the development, preparation, and characterization of dosage forms) will be assessed in PHS 300 and PHS 301 through in-class exams. Upon completion, the results will be communicated at the end of the academic year.

- VI. **Changes Implemented:** Describe any changes implemented as a result of assessment activities completed in the previous assessment cycle to “close the loop”. Indicate the semester in which the change was implemented and when it will be reassessed. (*Use last assessment report submitted to obtain information on what changes were recommend in the previous report*).

In order to improve PSLO 3.1, it was suggested that PHS 401 include more anatomy and physiology in the curriculum despite its effectiveness. The department has tried to implement the changes through the respective instructors and it will be reevaluated in the cycle of 2019-2020 academic year.

- VII. **Synopsis of assessment plan for upcoming academic year:** Using the *5-year plan* and this year’s findings, identify program goals and program level student learning outcomes the program will assess in the next academic year and provide rationale.

As stated in Section V, PSLOs 2.1, 2.2, 2.3, and 2.4 will be assessed through in-class exams and activities. The changes can be made if a certain situation arises or the instructor felt the necessity in another way.

- VIII. **(Optional): Other Activities/Accomplishments:** Describe other program assessment activities related to student learning for this academic year.

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