



OFFICE OF ACADEMIC ASSESSMENT
The UNIVERSITY of OKLAHOMA

Program Assessment Report

2024 - 2025

CAS - Chemistry & Biochemistry (PhD)

General Information

Program Mission/Description

The Ph.D. degree in the Department of Chemistry and Biochemistry is awarded for excellence in research and scholarship in an area of chemistry and/or biochemistry. It signifies the acquisition of a thorough and comprehensive understanding of a research area as well as the attainment of a high level of professional independence and competence. In addition to completing and passing a set of coursework, students perform independent research in a laboratory under a mentor to create a Ph.D. dissertation. Students are required to enroll in seminar courses, and present their original research to peers and faculty at least once a year. The curriculum is expected to create a high-level of proficiency in independent research skills, data analysis, and effective science communication.

College

Arts & Sciences

Department/School/Division

Chemistry and Biochemistry

Assessment Liaison

George Richter-Addo

CAS - Chemistry & Biochemistry (PhD)

Research Skills 1

Student Learning Outcome (SLO)

Students will demonstrate the ability to conduct independent literature research and to produce appropriate scientific writings and oral presentations in an area of chemistry and/or biochemistry.

Outcome Status

Active

Direct - Course Embedded Assessment

Assessment Method Description

Passing CHEM 5011 and CHEM 5021: First. year graduate students are required to enroll in a two-part Fundamentals course (CHEM 5011 and CHEM 5021) in the Fall and Spring semesters, respectively. Students are provided with information on resources for success in graduate school such as to how to search and critique relevant scientific literature, to write scientific reports, and learn general skills to navigate graduate school. Other professional development resources such as creating Individual Development Plans, preparing a professional biosketch, experimental design and ethics in research, and an introduction to OU mental health resources are provided as part of this course to enable students to prepare adequately for their graduate careers. In CHEM 5021, students are trained on the aspects related to writing high-quality research proposals to prepare them for the writing component of their General Examinations. Student performance will be assessed by graded activities such as safety training, written exercises, creation of Individual Development Plans, and class participation during discussions.

Performance Target

The expectation is that >90% of students will perform at the Satisfactory level.

Related Documents

[SLO - CHEM 5011-5021-PhD_2025.docx](#)

2024 - 2025

Assessment Results Entry Date

09/19/2025

Assessment Results

In Fall 2024, 16 students were enrolled in CHEM 5011, and all of them passed the course. In Spring 2025, 16 students enrolled in CHEM 5021, and all of them passed the course. The performance is at 100% for both courses. Thus, the department met the expected goal of >90% student success for this two-series course that prepares the students with professional skills required for success in graduate school.

Results Status

Target Met

Number of Students Assessed

16

USE OF ASSESSMENT RESULTS

No Changes Needed

CAS - Chemistry & Biochemistry (PhD)

No Changes Needed: The two-course series CHEM 5011 and CHEM 5021 was redesigned three years ago to better meet the needs of incoming students and ease their adjustment to the graduate school. The results indicate that modifications are helping in student success and no changes are needed at this time. However, the faculty will analyze the performance results every year to make any required changes to improve student performance, curriculum updating, and instructional modifications as needed.

First year graduate students who do not satisfactorily complete the Fundamentals courses will be interviewed by the Instructor of Record. Based on the results of the interview, it may be appropriate to alter the Fundamentals courses' syllabi either with respect to content or the order in which the topics are presented. If an unsatisfactory performance is determined to be associated with the student's effort (i.e., poor study habits, poor time management, etc.) rather than flaws in the course, the student will be counseled appropriately and remedial work or a change to a different degree program may be recommended.

Direct - Examination

Assessment Method Description

Passing Preliminary Examination:

Second year graduate students in the Ph.D. program will demonstrate preparedness for the General Examination (Graduate College requirement) by first passing the Preliminary Examination (departmental requirement). The students are assessed on their ability to critically analyze a scientific article in their field of study and present the work in the article as a formal presentation to their Ph.D. advisory committee. The committee will assess the student's depth of knowledge on the topic by asking questions related to the article covering experimental design, analysis of results, major scientific impact of the work, and potential problems in the scientific design and interpretation of the results.

Performance Target

The expectation is >90% of students to perform at satisfactory level.

Related Documents

[SLO - Preliminary Examination 2024-2025.docx](#)

2024 - 2025

Assessment Results Entry Date

09/19/2025

Assessment Results

Second year graduate students were admitted to the program in the prior 2023-2024 academic year; 19 students were admitted in Fall 2023 and 2 left the program with MS degrees, with 1 additional student entering the program in Spring 2024. 18 second year students took the Preliminary Exam during the 2024-2025 academic year, and all 18 of them passed. Performance = 100%

Results Status

Target Met

Number of Students Assessed

18

USE OF ASSESSMENT RESULTS

No Changes Needed

The students failing the Preliminary Exam will be interviewed by the department to identify the issues related to their failures. Any programmatic issues that caused the failure in the student to pass the Preliminary Exam will be discussed in a faculty meeting, and methods will be developed to resolve the issue. If the failure was due to unsatisfactory preparation from the student's side, that will be documented and used as necessary for advising the student (as well as future students) in the program.

Research Skills 2

Student Learning Outcome (SLO)

Students will demonstrate the ability to conduct independent laboratory research in an area of chemistry and/or biochemistry.

Outcome Status

Active

CAS - Chemistry & Biochemistry (PhD)

Direct - Project

Assessment Method Description

Passing CHEM 5080 (Laboratory Rotations): The first year students are required to participate and successfully pass the course CHEM 5080 (Laboratory Rotations). In this course, the students will perform research for a period of seven weeks each in two laboratories that closely match their research interests. The students will gain an intellectual understanding of a research problem the laboratory is focused on addressing and will contribute towards the research by participating and carrying out research working along the PI and other lab members of the assigned laboratory. Students are evaluated on the quality of a research report that focuses on demonstration of critical understanding of the research problem and data analysis as well as feedback from the faculty hosting the student on student accountability during the rotation period. Students are not evaluated based on whether the experiments worked positively or negatively, rather based on their assessment of the experimental methods and results, and their final laboratory rotation reports.

Performance Target

The expectation is that >90% of students will perform at the Satisfactory level.

Related Documents

[SLO - Laboratory Rotations_2024-2025.docx](#)

2024 - 2025

Assessment Results Entry Date

09/19/2025

Assessment Results

20 first year students were enrolled in CHEM 5080 (16 in the Fall, and an additional (new) 4 in the Spring), and all of them completed and passed the course. Performance = 100%.

Results Status

Target Met

Number of Students Assessed

20

USE OF ASSESSMENT RESULTS

No Changes Needed

First year graduate students who receive unsatisfactory grades for lab rotations will be interviewed to identify specific reasons for poor performance. Based on the results of this interview, students may be assigned remedial work or may be recommended to change to the non-thesis MS degree program. In a few instances, students are permitted to perform a third lab rotation, if the first two rotations did not help the student to find an ideal laboratory for their dissertation research.

20 students were admitted to the program in the 2024-2025 academic year, and all of them successfully completed the lab rotation course.

Direct - Annual Performance Report by Faculty/Adviser

Assessment Method Description

Departmental Annual Graduate Student Evaluation:

An annual evaluation for each graduate student enrolled in the program is conducted by the department of Chemistry and Biochemistry. The evaluation is done by the student's Ph.D. advisory committee that includes the Graduate College representative. The students will complete a report in a form that is provided by the department ahead of the evaluation. During the day of the evaluation, the student orally presents their accomplishments from the previous calendar year and set goals for the next calendar year. Based on the discussions during this meeting, students are provided feedback both verbally and through a written report that is signed by all the committee members. The signed evaluation report is submitted to the departmental Graduate Committee who will write their own evaluation letter that is signed by the Graduate Committee chair and concurred by the Graduate Liaison. A list of students who had an unsatisfactory performance evaluation is communicated to the Graduate College.

Performance Target

The expectation is that >90% of students will perform at the Satisfactory level.

CAS - Chemistry & Biochemistry (PhD)

Related Documents

[SLO - Advisory Committee Assessment_2025.docx](#)

2024 - 2025

Assessment Results Entry Date

09/19/2025

Assessment Results

During the 2024-2025 academic year, 89 students were enrolled in the PhD program. Of these, 68 were evaluated (67 with Satisfactory grades, and 1 with a Marginal grade). 1 student was not evaluated due to the student deciding to leave the program prior to identifying a faculty research mentor. An additional 12 students graduated with the PhD (hence not evaluated). 4 students transferred to the non-thesis MS program and graduated, and 4 new students who joined in Spring 2025 were not evaluated (too early to evaluate). Of the students who were evaluated, the performance was $67/68 = 98\%$.

Results Status

Target Met

Number of Students Assessed

68

USE OF ASSESSMENT RESULTS

No Changes Needed

When a student's Advisory Committee reports to the departmental Graduate Committee that the student's research performance is less than satisfactory, the Graduate Committee evaluates the materials provided by the student and the letter provided by the Advisory Committee. If required, the student will be counseled regarding their weaknesses and advised as to how performance can be improved. Students are usually given additional time to improve the deliverables. Some students may be advised to switch from the doctoral degree program to the MS degree program based on the results of the evaluation. The Graduate Committee also assesses the fairness of evaluation among the different students within the department and will take appropriate measures if needed.

Research Skills 3

Student Learning Outcome (SLO)

Students will demonstrate the ability to propose new research directions in an area of chemistry and/or biochemistry.

Outcome Status

Active

Direct - Examination

Assessment Method Description

Passing the General Exam: The students are required to take a General Exam in their fourth non-summer semester since their enrollment in the program. In preparing for the exam, students will identify a research question that is similar to their on-going research project or on a topic that is different than their on-going research. Students will prepare a hypothesis-driven written research proposal addressing 2-3 sub-areas related to the research question they have selected. Each of these questions is addressed by appropriate research methodology, followed by a proposed method to analyze and interpret the results, along with discussion of alternate methods in case of failure of the proposed method(s). Once the quality of the written proposal is assessed as satisfactory by their Ph.D. advisory committee, the student will move forward to the oral presentation of the project described in the written proposal. Based on a performance evaluation assessing the student's critical thinking and research problem solving skills, the committee will vote to pass/fail the student. In some cases, students are deemed to be not in the pass/fail category based on their performance and are given an "abeyance" where the student will provide additional materials as decided by their advisory committee to evaluate the performance gap in their General Exam.

Performance Target

The expectation is that >90% of students will perform at the Satisfactory level.

Related Documents

CAS - Chemistry & Biochemistry (PhD)

[SLO - Passing General Examination-PhD_2025.docx](#)

2024 - 2025

Assessment Results Entry Date

09/19/2025

Assessment Results

Of the 18 students who took the Preliminary Examination (departmental requirement) and passed, 15 of them proceeded to take the General Examination (Graduate College requirement) and all 15 passed; 2 of the initial 18 decided to leave with MS degrees, and 1 will take the (delayed) General Examination in Fall 2025 due to parental leave last Fall. Of those who took the General Examination, the performance level was 15/15 = 100%.

Results Status

Target Met

Number of Students Assessed

15

USE OF ASSESSMENT RESULTS

No Changes Needed

No Changes Needed: Although we are meeting the success rate specified for the General Exam category, the department is proactively offering help to the students by offering General Exam workshops every Fall semester. The workshop has three parts: (i) the Graduate Liaison describing the Graduate College paperwork required for the General Exam along with a discussion on components for the written proposal and oral presentation; (ii) a small student-led discussion group tailored to different sub-areas of Chemistry and Biochemistry that is offered by the departmental graduate student organization (CBR, Society of Chemical and Biochemical Researchers); and (iii) a faculty panel from different sub-areas of Chemistry and Biochemistry to answer student questions related to the General Exam. We envision that this will reduce the stress and uncertainty related to the General Exam performance which is the qualifying exam for the Ph.D. trajectory.

Students who do not pass their General Exam on their first try will be offered a second chance after discussions with their Ph.D. advisory committee and the Graduate College. If the student does not take and pass the General Exam the second time or decides not to go through with a second exam, they will be terminated from the doctoral program. The Advisory Committee will counsel the student and may recommend that the student switch to either the thesis MS program or the non-thesis MS program. If a flaw in the General Exam procedures is suspected, this information will be communicated to the departmental faculty, who will discuss pertinent issues and recommend appropriate changes to the examination methods.

Communication Skills

Student Learning Outcome (SLO)

Graduate students will demonstrate the ability to communicate research results to the scientific community.

Outcome Status

Active

Direct - Course Embedded Assessment

Assessment Method Description

CAS - Chemistry & Biochemistry (PhD)

Passing seminar courses:

All graduate students enrolled in the Chemistry and Biochemistry program have to enroll in a seminar during the Fall and Spring semesters, starting in their second semester in the program, by which time they have decided the sub-area for their Ph.D. research. This is designed to be a weekly seminar where students present the results from the original research towards their Ph.D. dissertation. Other graduate students and faculty members of the particular sub-area provide feedback on the performance as well as suggestions on research methodologies. Students are evaluated based on regular attendance to the seminar, the quality of their presentation, and ability to address questions from the audience. In addition to this formal seminar course, students also enroll in a 0-credit departmental colloquium during the Fall and Spring semesters. In this colloquium, we bring in prominent national speakers from the different sub-areas of Chemistry and Biochemistry as a means to develop a broader knowledge in closely related fields, to enable collaborations with the visiting scientist, and also to foster networking opportunities for the students with scientists outside our university."

Performance Target

The expectation is that >90% of students will perform at the Satisfactory level.

Related Documents

[SLO - Passing Seminar Courses-PhD_2025.docx](#)

2024 - 2025

Assessment Results Entry Date

09/19/2025

Assessment Results

87 graduate students were enrolled in the departmental colloquium. 65 of our graduate students were enrolled in divisional/focus-area seminars for Fall 2024, and 77 for Spring 2025. All these students passed the seminar courses.

Results Status

Target Met

Number of Students Assessed

87

USE OF ASSESSMENT RESULTS

Overall Program Effectiveness

Even though we met the success criteria specified for this category, extra feedback is being offered to students in specific focus areas of research. For example, the Biochemistry sub-area seminar participants provide formal peer reviews to the presenter. This anonymous feedback from peers is impactful and supplements faculty-based feedback. In the organic chemistry sub-area, problem sets on synthesis reactions are discussed to enhance the synthetic skills of students. Improvements will be made such other focus areas/divisions adopting such peer-review methods as appropriate for each focus area of Chemistry/Biochemistry.

The skills needed to prepare and deliver high-quality and research presentations are critical to the development of independent research scientists. Students who do not satisfactorily complete seminar courses will be provided constructive criticism so that they can improve; they will be given opportunities for more practice, either by delivering an improved presentation or preparing a different talk. Students who fail due to unsatisfactory attendance will be documented by the department and counseled.

Direct - Oral Dissertation or Thesis Defense

Assessment Method Description

Dissertation Defense: The students have to write a dissertation representing findings from the original research they have performed towards their Ph.D. degree. The students will also give an oral exam defending their Ph.D. research. The written component is evaluated by all the members of the Ph.D. advisory committee and students are given feedback for improvements if needed. The oral examination is a two part exam, where the first part is an open exam attended by the general audience. The second part of the exam is a closed non-public session where the advisory committee asks deeper and more specific questions related to the dissertation research to assess the subject-matter understanding of the student and to compare their proficiency with what is expected for a graduating student from the department. The results are communicated with the student and the Graduate College using the appropriate form provided by the Graduate College.

Performance Target

CAS - Chemistry & Biochemistry (PhD)

The expectation is that >90% of students will perform at the Satisfactory level.

Related Documents

[SLO - Dissertation Defense_2025.docx](#)

2024 - 2025

Assessment Results Entry Date

09/19/2025

Assessment Results

During the 2024-2025 academic year, 12 students held their Ph.D. dissertation defenses. All of them passed their dissertation defense and were awarded Ph.D. degrees. Performance = 100%

Results Status

Target Met

Number of Students Assessed

12

USE OF ASSESSMENT RESULTS

No Changes Needed

The Ph.D. dissertation is a written description of original scientific research. We expect students who have achieved “excellence in research and scholarship” to be able to write a dissertation and to explain their work to their peers and faculty in the department. Students who are unable to satisfactorily describe their work in written form or to orally defend their research efforts will not be awarded a Ph.D. degree from our department. Students who are unable to pass their Ph.D. defense will be interviewed to identify issues that caused or contributed to their failures. If the failure was due to department policies, they will be rectified through faculty discussions. If the failure occurred due to poor student choices and performances, those items will be used for advising the future cohorts.