

## STUDENT LEARNING ASSESSMENT PROGRAM SUMMARY FORM

**Degree and  
Program Name:**

Master's Degree in Biochemistry and Biotechnology (BCT)

**Period of  
Assessment:**

First course registration (SU17) to present (October 15, 2020)

**Submitted By:**

Thomas Canam (Coordinator)

### PART ONE

<b>What are the learning objectives?</b>	<b>How, where, and when are they assessed?</b>	<b>What are the expectations?</b>	<b>What are the results?</b>	<b>Committee/ person responsible? How are results shared?</b>
<p>1. Students will demonstrate a depth of content knowledge appropriate to the Master's level and preparative to successfully fill employment opportunities in the fields of biochemistry and/or biotechnology, or enter doctoral or professional programs.</p>	<p>Students are required to complete substantial graduate coursework, primarily in the departments of Biological Sciences and Chemistry &amp; Biochemistry.</p> <p>Graduate student employment or admission to doctoral and professional programs.</p>	<p>Students will maintain appropriate grades for the graduate level (GPA &gt; 3.0).</p> <p>All graduates will enter into the relevant workforce (e.g. biotechnology companies) and/or gain admission into professional programs (e.g. medical school).</p>	<p>The four students that have graduated from the program had a GPA &gt;3.0. The average GPA was 3.7.</p> <p>Two of the four graduates of this program are employed by biotechnology companies. Another graduate is employed at a hospital, and the fourth graduate is currently enrolled in medical school.</p>	<p>Instructors in graduate courses are responsible for assigning course grades, and the Graduate Coordinator is responsible for monitoring the performance of the students during degree completion.</p> <p>The Graduate Coordinator communicates with students about their career prospects while at EIU, and maintains communication with students for at least a semester after graduation to determine if their career goals have been met.</p>

<p>2. Students will demonstrate evidence of advanced scholarship through research and/or internship activities.</p>	<p>Completion of the required course BCT 5980 (Internship in Biotechnology).</p>	<p>Students will contribute to data collection and/or analysis at their internship location.</p>	<p>All graduates of this program (4 students) completed internships. 3 students worked at EIU laboratories, while 1 student completed an internship at a research lab at Louisiana State University. In all cases, students contributed to scientific experiments at their internship locations.</p>	<p>Graduate Coordinator collects documentation from internship supervisor, verifying the quantity and quality of the research conducted.</p>
<p>3. Students will demonstrate effective oral and written communication skills appropriate to biochemistry and biotechnology fields (e.g. ability to synthesize and interpret molecular and biochemical data, cite relevant peer-reviewed scientific literature).</p>	<p>Completion of the required internship (internal or external to EIU).</p> <p>Several of the required and elective courses in Biological Sciences and Chemistry &amp; Biochemistry require written communication in the form of essays, assignments, and/or oral presentation to the class.</p>	<p>When possible, students are encouraged to present their research (e.g. peer-reviewed publication, conference presentations).</p> <p>Students will meet the expectations of the course assignments as provided by the course instructor.</p>	<p>0/4 graduates in the program have been co-authors on publications resulting from internship experiences. 1/4 students presented their research as a poster at an EIU-sponsored event.</p> <p>All students that have graduated from the program had a GPA &gt;3.0. The average GPA was 3.7.</p>	<p>Graduate Coordinator communicates with students during and after degree completion to obtain evidence for research presentations.</p> <p>The course instructor(s) evaluate the student performance and assign a grade for the course.</p>
<p>4. Students will demonstrate critical thinking and problem-solving skills relating to laboratory techniques that are specific to biochemical, pharmacological, and/or medical fields.</p>	<p>Completion of the required techniques course (BCT 5000: Techniques in Biotechnology), which is entirely laboratory-based experiments guided by an instructor(s) in Biological Sciences and/or Chemistry &amp; Biochemistry.</p>	<p>Students will use their relevant experience and knowledge from previous coursework to complete laboratory activities that involve self-direction.</p>	<p>2/4 graduates completed this laboratory-based course (BCT 5000). Both students received a grade of A for this course. The other two graduates used independent research to complete this requirement (due to scheduling conflicts).</p>	<p>The course instructor(s) evaluate the student performance and assign a grade for the course.</p>

## PART TWO

Describe your program's assessment accomplishments since your last report was submitted. Discuss ways in which you have responded to the CASA Director's comments on last year's report or simply describe what assessment work was initiated, continued, or completed.

This is the first assessment for the MS in BCT program. As such, I have included the assessment data from the first semester of course registration (SU17) to present (October 15, 2020).

Four students have graduated from the MS in BCT program. As described in my IBHE Short Progress Report, the MS in BCT program aimed for graduates to be "well prepared to take positions in biotechnology and pharmaceutical industries or pursue advanced degrees especially in the medical sciences." Two of the four graduates of this program are currently employed in the pharmaceutical industry (Senti Biosciences, AmbioPharm), and one in the medical industry (Carle Foundation Hospital). The fourth graduate is currently enrolled in medical school at the University of Chicago. These early successes suggest that the program is achieving its original goals and objectives.

## PART THREE

Summarize changes and improvements in **curriculum, instruction, and learning** that have resulted from the implementation of your assessment program. How have you used the data? What have you learned? What are your plans for the future?

This program is relatively new, with an assessment strategy that is in its infancy. Although the usual metrics of grades and GPA have been helpful (e.g. Objective 3), it is clear that more thorough assessment would be valuable. For example, for future evaluations it will be helpful to obtain scores (1-5 scale) from course instructors on both oral and written ability of the BCT students. Currently, the assignments that evaluate oral and written ability are embedded in the course grade, but it is not clear how oral and written assignments contributed to their overall grade. This can be accomplished by emailing relevant faculty a simple assessment survey for the BCT students that recently took their course. As coordinator of the program, I will then compile the results for future assessment reports.

Similarly, the overall grade for the BCT 5000 (Techniques in Biotechnology) course is not sufficient to assess student ability in field-specific techniques (e.g. molecular diagnostics, protein synthesis) discussed in Objective 4. In the future, scores (1-5 scale) will be requested from the instructor(s) of this course for these specific sub-disciplines. The outcome will allow for adjustments to be made to the program curriculum and/or the content of the BCT 5000 course.

It would also be helpful to identify the likelihood of students co-authoring (1) peer-reviewed publications, and (2) conference presentations, resulting from their BCT 5980 (Internship in Biotechnology) experience. This will be accomplished by contacting the supervisor(s) at the internship location and requesting likelihood scores (1-5 scale) for each of these metrics.

**Student Learning Assessment Program**  
**Response to Summary Form**  
**Graduate Program 2020**  
 April 21, 2021

Departments: Biological Sciences and Chemistry

Degree and Program Name: **Master's Degree in Biochemistry and Biotechnology**

Reviewer: Dr. Nikki Hillier, Graduate Assessment Coordinator, Graduate School

Category	Comments
<b>Learning Objectives</b>	The objectives for the program encompass all the graduate learning goals established by EIU's Council on Graduate Studies.
<b>How, Where, and When Assessed</b>	The assessment plan is clear. Students are assessed throughout the program using GPA; and at the end of the program during internship, and employment or doctoral program placement.
<b>Expectations</b>	Expectations are included but would benefit from additional clarity.
<b>Results</b>	The program is meeting and exceeding all learning goals, and all graduates have careers in the field or are in medical school.
<b>How Results Will be Used</b>	All assessments are reported to the Graduate Coordinator. The Graduate Coordinator uses the assessments to monitor student progress and guide discussions regarding future career goals with students. The report did not indicate whether the findings are shared with other graduate faculty associated with the program; if they are not, the program would benefit from additional graduate faculty engagement and input on the assessment findings.
<b>Recommendations</b>	As mentioned in the report, this effort is a good start to assessing student learning in this program. It is outstanding that all your graduates are either in the field or in medical school. It is noted that there are some shortcomings in this assessment plan, as it is a newer program. The next steps for assessment sound like valuable additions to your plan. In addition to the handful of ideas proposed: a rubric for assessment of oral and written communication skills, and more detailed assessment for certain projects or papers in class as opposed to an overall grade may be helpful; you may consider sharing the data or compiled report with a graduate faculty committee to look for gaps or areas for improvement. This can be done annually at the close of the academic year. The other matter you may consider is including clearer, more measurable expectations for the plan: designate a percentage of students expected to score a B or higher in a class or on a particular assignment, or the percent of students expected to have publications or presentations. It is clear from your report that you have a solid program that meets the needs of the students enrolled for student success.

The Council on Graduate Studies approved of revised learning goals on December 8, 2020, which included the addition of an Ethical and Professional Responsibility learning goal. Please consult with your graduate faculty members to determine how to incorporate this learning goal into future assessment activities.