

Academic Program Assessment Report for AY 2023-2024

Program: <u>Biology MS</u> completed: <u>6/2/24</u>\_\_\_\_\_ (Due: June 1, 2024) Completed by: Claire Ramos Date report

Assessment contributors (other faculty involved): Caprioglio, Diawara, Gabaldon, Garcia Costas, Izaguirre, Martinez, Sandmeier, Smith, Trumbo

Please describe the 2023-2024 assessment activities and follow-up from prior years for your program below. Please complete this form for <u>each</u> <u>undergraduate major</u>, <u>and graduate program</u> (e.g., B.A., B.S., B.A.S, M.S., DNP, etc.) as well as stand-alone <u>minors</u>, <u>or certificates</u> in your department. Please copy any addenda (e.g., rubrics) and paste them in this document, save and submit it to both the Dean of your college/school and to the Associate Provost as an email attachment by June 1, 2024. You'll also find this form on the assessment website at https://www.csupueblo.edu/assessment-and-student-learning/resources.html. Thank you.

**Brief statement of Program mission and goals:** The Biology Program provides the biological component of the liberal arts education. We promote student understanding of biological concepts relevant to the individual and society, and foster an appreciation of scientific inquiry. Biology is an integral subject for other majors' requirements and the Biology department is committed to fulfilling these service courses and general education for other departments.

The graduate program leading to the degree of Master of Science in Biology prepares students to apply basic scientific principles to the practical biological problems encountered in business, industry, government, and education. Graduates from the program will be able to apply the techniques of scientific research to real-world biological problems.

Our students obtain a broad education, covering a wide variety of biological disciplines. We focus on the student, facilitating hands-on experience, interactions with faculty, and opportunities for graduate research in topics of regional interest.

Upon completion of the MS in Biology, students will have achieved the following student learning outcomes as stated in the University Catalog: SLO 1: **Mastery of the Scientific Method** – Independent development and mastery of problem solving skills including experimental design, execution, critical analysis, and interpretation of the results of original scientific experimentation (thesis) or experiential learning (internship).

SLO 2: Dissemination of Scientific Products – Persuasive communication and defense of significant results of original scientific investigation presented in both written and oral format at a graduate peer-professional level.

SLO 3: **Utilization of the Literature** - Critical evaluation of an independently accessed comprehensive body of scientific literature which is project relevant and foundational in supporting and explaining research findings in both written and oral format.

SLO 4: **Development of a Relevant Knowledge Base** - Development of intrinsically held fundamental field-specific knowledge which will be applied to explain and defend research findings at a level of mastery expected by peer-professionals.

SLO 5: **Professionalism and Self Responsibility** – Maintain a consistent professional work ethic of independently taking the initiative and motivation to produce tangible products of a quality commensurate with peer-standards in graduate or professional schools or in the career field being pursued.

**I. Assessment of Student Learning Outcomes (SLOs) in this cycle.** Including processes, results, and recommendations for improved student learning. Use Column H to describe improvements planned for 2023-2024 based on the assessment process.

A. Which of the program SLOs were assessed during this cycle? Please include the outcome(s) verbatim from the assessment plan.	B. When was this SLO <u>last</u> reported on prior to this cycle? (semeste r and year)	C. What method was used for assessing the SLO? Please include a copy of any rubrics used in the assessment process.	D. Who was assessed? Please fully describe the student group(s) and the number of students or artifacts involved (N).	E. What is the expected proficiency level and how many or what proportion of students should be at that level?	F. What were the results of the assessment? (Include the proportion of students meeting proficiency.)	G. What were the department's conclusions about student performance?	H. What changes or improvements to the <u>program</u> are planned based on this assessment?
SLO 1: Mastery of the Scientific Method – Independent development and mastery of problem solving skills including experimental design, execution, critical analysis, and interpretation of the results of original scientific experimentation (thesis) or experiential learning (internship).	Spring 23	Rubric administered during thesis defense and at committee meetings. (Appendix 1)	We assessed students active in the program in the last five years since the beginning of our new assessment protocol in summer 19. 46 of 56 (82%) students were assessed at least once and 100% of 20 graduates were assessed at their thesis defense. 104 total committee meetings were evaluated and 20 defenses	It is expected that 100% of students are at least proficient at this SLO by thesis defense (i.e. average score is ≥ 3, where 1=ineffective, 2=developmental, 3=proficient, 4=excellent. See assessment plan for scoring details)	We saw an increasing trend in performance as students moved through the program (see figure 1 following table). 100% (20 of 20) of students were scored proficient or better at their thesis defense.	By graduation students are performing at the expected level. Prior to graduation, some students are still developing skills.	No changes to the program at this time. We are meeting programmatic goals.
SLO 2: Dissemination of Scientific Products – Persuasive communication and defense of	Spring 23	Rubric administered during thesis defense and	We assessed students active in the program in the last five years since the beginning of our new assessment protocol in summer 19.	It is expected that 100% of students are at least proficient at this SLO by thesis defense (i.e.	We saw an increasing trend in performance as students moved through the	By graduation students are performing at the expected level. Prior to	No changes to the program at this time. We are meeting

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significant results of original scientific investigation presented in both written and oral format at a graduate peer-professional level.		at committee meetings. (Appendix 1)	46 of 56 (82%) students were assessed at least once and 100% of 20 graduates were assessed at their thesis defense. 104 total committee meetings were evaluated and 20 defenses	average score is ≥ 3, where 1=ineffective, 2=developmental, 3=proficient, 4=excellent. See assessment plan for scoring details)	program (see figure 1 following table). 100% (20 of 20) of students were scored proficient or better at their thesis defense.	graduation, some students are still developing skills.	programmatic goals.
SLO 3: Utilization of the Literature - Critical evaluation of an independently accessed comprehensive body of scientific literature which is project relevant and foundational in supporting and explaining research findings in both written and oral format.	Spring 23	Rubric administered during thesis defense and at committee meetings. (Appendix 1)	We assessed students active in the program in the last five years since the beginning of our new assessment protocol in summer 19. 46 of 56 (82%) students were assessed at least once and 100% of 20 graduates were assessed at their thesis defense. 104 total committee meetings were evaluated and 20 defenses	It is expected that 100% of students are at least proficient at this SLO by thesis defense (i.e. average score is ≥ 3, where 1=ineffective, 2=developmental, 3=proficient, 4=excellent. See assessment plan for scoring details)	We saw an increasing trend in performance as students moved through the program (see figure 1 following table). 100% (20 of 20) of students were scored proficient or better at their thesis defense.	By graduation students are performing at the expected level. Prior to graduation, some students are still developing skills.	No changes to the program at this time. We are meeting programmatic goals.
SLO 4: Development of a Relevant Knowledge Base - Development of intrinsically held fundamental field- specific knowledge which will be applied to explain and defend research findings at a level of mastery expected by peer-professionals.	Spring 23	Rubric administered during thesis defense and at committee meetings. (Appendix 1)	We assessed students active in the program in the last five years since the beginning of our new assessment protocol in summer 19. 46 of 56 (82%) students were assessed at least once and 100% of 20 graduates were assessed at their thesis defense. 104 total committee meetings were evaluated and 20 defenses	It is expected that 100% of students are at least proficient at this SLO by thesis defense (i.e. average score is ≥ 3, where 1=ineffective, 2=developmental, 3=proficient, 4=excellent. See assessment plan for scoring details)	We saw an increasing trend in performance as students moved through the program (see figure 1 following table). 100% (20 of 20) of students were scored proficient or better at their thesis defense.	By graduation students are performing at the expected level. Prior to graduation, some students are still developing skills.	No changes to the program at this time. We are meeting programmatic goals.

SLO 5: Professionalism and Self Responsibility – Maintain a consistent professional work ethic of independently taking the initiative and motivation to produce tangible products of a quality commensurate with peer-standards in graduate or professional schools or in the career field being pursued.	Spring 23	Rubric administered during thesis defense and at committee meetings. (Appendix 1)	We assessed students active in the program in the last five years since the beginning of our new assessment protocol in summer 19. 46 of 56 (82%) students were assessed at least once and 100% of 20 graduates were assessed at their thesis defense. 104 total committee meetings were evaluated and 20 defenses	It is expected that 100% of students are at least proficient at this SLO by thesis defense (i.e. average score is ≥ 3, where 1=ineffective, 2=developmental, 3=proficient, 4=excellent. See assessment plan for scoring details)	We saw an increasing trend in performance as students moved through the program (see figure 1 following table). 100% (20 of 20) of students were scored proficient or better at their thesis defense.	By graduation students are performing at the expected level. Prior to graduation, some students are still developing skills.	No changes to the program at this time. We are meeting programmatic goals.
Time to Graduate	Never	Length of time from the start of the program to successful defense	All graduated students in the last 5 years (N = 20)	80% of students graduate in 3 years or less.	60% of graduates in the program finished in 3 years or less. 15% of students took over 5 years to graduate	Many students take longer to graduate than is preferable, both for students and faculty. The limiting factors that slows graduation is thesis writing.	We plan to initiate a peer mandatory peer support group to encourage progress on thesis writing. Group meetings will be required for students enrolled in BIOL 589 Thesis Defense and CR 500 Continuing Registration. The group will be facilitated by the graduate director.
Program	Never	Proportion of	All students who have	Less than 20%	45% of students	Better support	We plan to
completion		students	dropped out of the	of students who	who left the	for thesis	initiate a peer

failing to complete the program.	program in the last 5 years (N = 11)	leave the program do so because that did not complete their thesis.	program having completed all work except for their thesis. The remaining students left the program for other reasons (e.g. admission to desired professional school, family obligations, mentor conflict).	writing will help a larger number of students to complete the program.	mandatory peer support group to encourage progress on thesis writing. Group meetings will be required for students enrolled in BIOL 589 Thesis Defense and CR 500 Continuing Registration. The group will be
			obligations, mentor conflict).		Registration. The group will be
					facilitated by the graduate director.

**Comments on part I reporting:** This is our fourth year using our new rubric to evaluate all 5 SLO's at every committee meeting in addition to the thesis defense. For all 5 SLO's there is a general upward trend as students progress through the program (Fig 1). All 20 of our graduating students in the last 5 years performed at the proficient level or above for all 5 SLO's at their thesis defenses. Based on the criteria set forward by our assessment plan, we are meeting our programmatic goals at this time.



Fig 1: Average student scores for each SLO as students progress through the degree. 1=ineffective, 2=developmental, 3=proficient, 4=excellent.

The department feels that our SLOs are important and relevant to the degree and the field and that our expectations are rigorous (100% of students reaching proficiency or mastery by graduation). The department feels that increasing our expectations (to 100% mastery?) is not reasonable as all people have strengths and weaknesses and to expect mastery of all aspects is not realistic. Therefore, the department has elected not to modify the SLOs or programmatic goals. Instead the department has identified two other metrics relevant to student success, time to graduation and reason for failing to complete the program, to assess going forward. We have modified the assessment plan to include these metrics and set a goal of 80% of students graduating in 3 or fewer years, and no more than 20% of students leaving the program having completed all requirements but the thesis. Both of these new metrics hinge on successful thesis writing, which many students struggle with. To support students in their writing, we are implementing a thesis writing peer support group that will be required for all students enrolled in BIOL 589 Thesis Defense and CR 500 Continuous Registration. In this group students will set goals and hold each other accountable. This group will be facilitated by the graduate director.

**II.** Closing the Loop. Describe at least one data-informed change to your curriculum during the 2023-2024 cycle. These are those that were based on, or implemented to address, the results of assessment from previous cycles.

A. What SLO(s) or other issues did you address in this cycle? Please include the outcome(s)	B. When was this SLO last assessed to generate the data which informed the change? Please indicate the	C. What were the recommendations for change from the previous assessment column H and/or feedback?	D. How were the recommendations for change acted upon?	E. What were the results of the changes? If the changes were not effective, what are the next steps or the new recommendations?
verbatim from	semester and year.			
the assessment				
plan.				
Collect data on	2020-2024	N/A	Data was collected and a	A thesis writing peer support group has been
the length of			goal was set for 80% of	proposed to help students make progress on
time students			students finishing in less	their theses.
take to graduate			than 3 years and less than	
and number of			20% of students who fail to	
students and			complete the program do	
reasons why			so because they didn't not	
students fail to			complete their thesis.	
complete their				
degrees and we				
will set targets				

for		
improvement.		

**Comments on part II follow through:** We have identified thesis writing as a significant barrier to successful completion of the program in a timely pattern and have developed a plan to support thesis writing within the program. It will take several years of data collection to assess the impact of this program on student ourcomes.

## Degree Program Action Plan Update (from last Program Review)

Program/ Department/Person completing:

Date of last program review: 2018Date of next program-specific accreditation review (if applicable): 2024Date of this update: 6/2/24Dean's approval:

- Briefly summarize annual updates to the program status including major accomplishments and challenges.
- Be sure to include any program accreditation updates, where appropriate.

	Program Impact	Proposed actions (if applicable)
Accomplishments	80% growth in enrollment growth since last program	none
Description	review.	
Challenges	Nearing maximum capacity for program.	Hire additional biology faculty
Description		

Program Accreditation updates or challenges	

Indicate progress within the last year(s) on items from the current program action plan.

Specific Item from Action Plan	Progress made on Action Plan item (indicate when completed)	Recommendations and projected timeline for further action	Resources Needs update (current, reallocation, new)	Person Responsible for further action
Increase the graduate student stipend/tuition waiver/number of TA positions	None	When funds available	New funds needed	Biology Program Chair, Biology Faculty members, CSTEM Dean