Academic Program Assessment Report for AY 2022-2023   **Program:__MS Biology_____**

    (Due: June 1, 2023)   **Date report completed: __6/8/23_____**

                    Completed by:__Claire Ramos_____

          Assessment contributors (other faculty involved): _Caprioglio, Sandmeier, Garcia Costas_____

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 last reported on prior to this cycle? (semester 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/improvements to the program 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 22	Rubric administered during thesis defense and at committee meetings. (Appendix 1)	We assessed students active in the program in the last four years since the beginning of our new assessment protocol in summer 19. 45 of 54 (83%) students were assessed at least once and 100% of 16 graduates were assessed at their thesis defense. 92 total committee meetings were evaluated and 16 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% (16 of 16) 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. We will continue to collect data as a large cohort of students are expected to graduate in the next year.
SLO 2: Dissemination of Scientific Products – Persuasive	Spring 22	Rubric administered during thesis defense and	We assessed students active in the program in the last four years since	It is expected that 100% of students are at least proficient at this	We saw an increasing trend in performance as students	By graduation students are performing at the expected	No changes to the program at this time. We are meeting programmatic goals. We

communication and defense of significant results of original scientific investigation presented in both written and oral format at a graduate peer-professional level.		at committee meetings. (Appendix 1)	the beginning of our new assessment protocol in summer 19. 45 of 54 (83%) students were assessed at least once and 100% of 16 graduates were assessed at their thesis defense. 92 total committee meetings were evaluated and 16 defenses	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)	moved through the program (see figure 1 following table). 100% (16 of 16) of students were scored proficient or better at their thesis defense.	level. Prior to graduation, some students are still developing skills.	will continue to collect data as a large cohort of students are expected to graduate in the next year.
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 22	Rubric administered during thesis defense and at committee meetings. (Appendix 1)	We assessed students active in the program in the last four years since the beginning of our new assessment protocol in summer 19. 45 of 54 (83%) students were assessed at least once and 100% of 16 graduates were assessed at their thesis defense. 92 total committee meetings were evaluated and 16 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% (16 of 16) 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. We will continue to collect data as a large cohort of students are expected to graduate in the next year.
SLO 4: Development of a Relevant Knowledge Base - Development of intrinsically held fundamental field-	Spring 22	Rubric administered during thesis defense and at committee meetings. (Appendix 1)	We assessed students active in the program in the last four years since the beginning of our new assessment protocol in summer 19. 45 of 54 (83%)	It is expected that 100% of students are at least proficient at this SLO by thesis defense (i.e. average score is ≥ 3, where	We saw an increasing trend in performance as students moved through the program (see figure 1	By graduation students are performing at the expected level. Prior to graduation, some students	No changes to the program at this time. We are meeting programmatic goals. We will continue to collect data as a large cohort of students are expected

specific knowledge which will be applied to explain and defend research findings at a level of mastery expected by peer-professionals.			students were assessed at least once and 100% of 16 graduates were assessed at their thesis defense. 92 total committee meetings were evaluated and 16 defenses	1=ineffective, 2=developmental, 3=proficient, 4=excellent. See assessment plan for scoring details)	following table). 100% (16 of 16) of students were scored proficient or better at their thesis defense.	are still developing skills.	to graduate in the next year.
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 22	Rubric administered during thesis defense and at committee meetings. (Appendix 1)	We assessed students active in the program in the last four years since the beginning of our new assessment protocol in summer 19. 45 of 54 (83%) students were assessed at least once and 100% of 16 graduates were assessed at their thesis defense. 92 total committee meetings were evaluated and 16 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% (16 of 16) 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. We will continue to collect data as a large cohort of students are expected to graduate in the next year.

Comments on part I: 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. Faculty participation in evaluations was down this year with only 4 of 8 tenure track faculty turning in committee meeting evaluations. As a result, students without one of those 4 faculty on their committee did not get evaluated. Because the 4 participating faculty are very active in the graduate program, the majority of students were still evaluated. The program director (Ramos) will improve reminders to ensure more participation going

forward. Students have committee meetings every semester throughout the degree, so we can track student improvement as they progress through the program (Fig. 1).
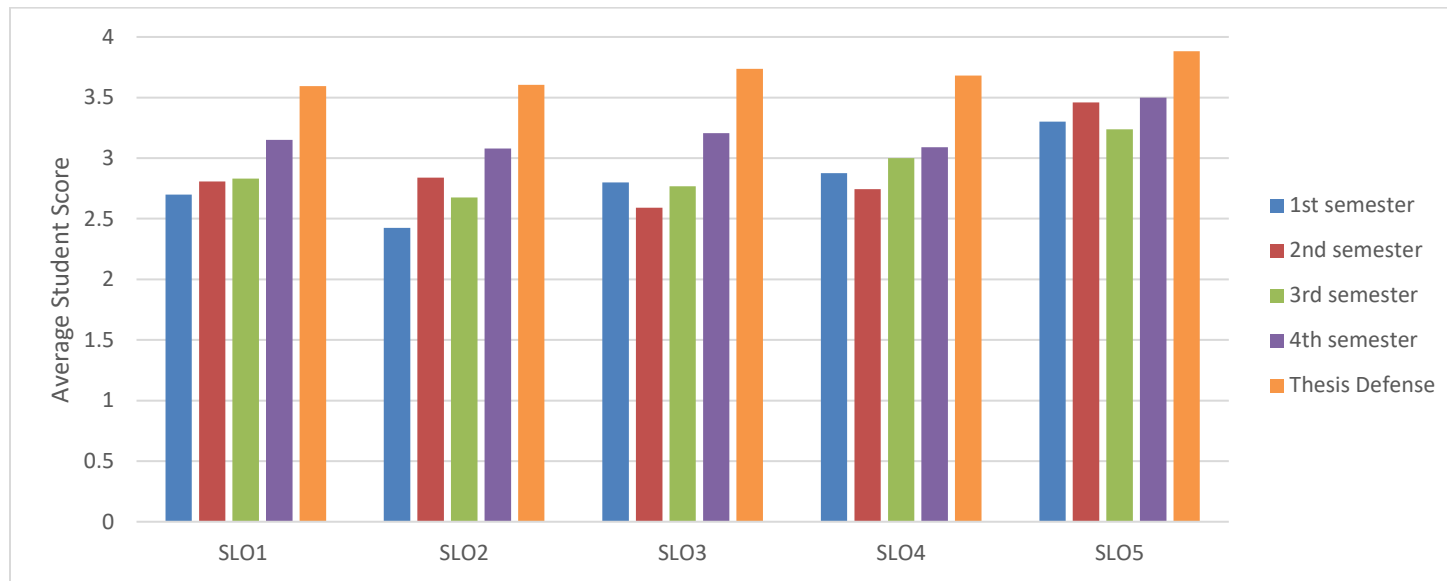

Fig 1: Average student scores for each SLO as students progress through the degree. 1=ineffective, 2=developmental, 3=proficient, 4=excellent.

For all 5 SLO's there is a general upward trend as students progress through the program. All 16 of our graduating students in the last 4 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. The sample size is still relatively small and we expect a large cohort of students to graduate in the next year. We intend to see if these patterns hold true with a larger sample. Since we are meeting programatic goals for all of our SLO's, the department has discussed what other metrics would be useful to assess. The department identified two other metrics to investigate going forward, the length of time to degree completion and the proportion of students who do not complete their degree. Over the next year we will collect data on the length of time students take to graduate and number of students and reasons why students fail to complete their degrees and we will set targets for improvement.

II. Closing the Loop. Describe at least one data-informed change to your curriculum during the 2022-2023 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) verbatim from the assessment plan.**	B. When was this SLO last assessed to generate the data which informed the change? Please indicate the semester and year.	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?
Discuss new metrics and whether we need to reconsider our SLOs	Spring 22	One peer reviewer was not satisfied that this was a sufficient plan for improvement.	We discussed new metrics and our existing SLOs	We identified time to graduation and proportion of students not completing degrees as metrics to collect data on going forward. We did not feel that changing the expectations for the SLOs merited a change at this time.

Comments on part II: We are meeting programmatic goals based on our SLOs. 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 disagrees with the evaluation of the peer reviewer that it is necessary to change our SLOs or our expectations for them. Instead the department has identified two other metrics relevant to student success on which to collect data, set goals, and assess going forward.