



Academic Program Assessment Report for AY 2019-2020

(Due: June 1, 2020)

Program: MS Biology

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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 2019-2020 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? (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 <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 19	Rubric administered during thesis defense and at committee meetings. (Appendix 1)	100% (3) of graduating masters students and 47% (8 of 17) of continuing students	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)	100% of graduating students were scored proficient (3, 3, 4). 63% of continuing students were scored as proficient (5/8)	By graduation students are performing at the expected level. Prior to graduation, students are still developing skills.	No changes to the program at this time. However, some changes to evaluation protocols are suggested below.

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.	Never	Rubric administered during thesis defense and at committee meetings. (Appendix 1)	100% (3) of graduating masters students and 47% (8 of 17) of continuing students	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)	100% of graduating students were scored proficient (3, 3.3, 4). 88% of continuing students were scored as proficient (7/8)	By graduation students are performing at the expected level. Prior to graduation, students are still developing skills.	No changes to the program at this time. However, some changes to evaluation protocols are suggested below.
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.	Never	Rubric administered during thesis defense and at committee meetings. (Appendix 1)	100% (3) of graduating masters students and 47% (8 of 17) of continuing students	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)	100% of graduating students were scored proficient (3, 3, 4). 88% of continuing students were scored as proficient (7/8)	By graduation students are performing at the expected level. Prior to graduation, students are still developing skills.	No changes to the program at this time. However, some changes to evaluation protocols are suggested below.
SLO 4: Development of a Relevant Knowledge Base	Never	Rubric administered during thesis defense and	100% (3) of graduating masters students	It is expected that 100% of students are at least proficient at this SLO by thesis	100% of graduating students were scored proficient	By graduation students are performing at the expected	No changes to the program at this time. However, some changes to evaluation

- 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.		at committee meetings. (Appendix 1)	and 47% (8 of 17) of continuing students	defense (i.e. average score is ≥ 3 , where 1=ineffective, 2=developmental, 3=proficient, 4=excellent. See assessment plan for scoring details)	(3, 3.3, 4). 88% of continuing students were scored as proficient (7/8)	level. Prior to graduation, students are still developing skills.	protocols are suggested below.
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.	Never	Rubric administered during thesis defense and at committee meetings. (Appendix 1)	100% (3) of graduating masters students and 47% (8 of 17) of continuing students	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)	100% of graduating students were scored proficient (3.5, 4, 4). 100% of continuing students were scored as proficient (8/8)	Students are performing at the expected level throughout the program.	It may be that students who select this program already have levels of professionalism and responsibility that are acceptable and therefore this may not be a meaningful SLO. However, more data is needed to assess whether this is true.

Comments on part I:

II. Closing the Loop. Describe at least one data-informed change to your curriculum during the 2019-2020 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?
Development and implementation of new rubric to assess all SLOs and introduction of assessment to committee meetings.	Spring 19	We needed to assess all SLOs and not just SLO 1.	The new rubric was finalized and new policies for assessment were introduced.	All SLOs were evaluated for graduating students. A subset of continuing students were assessed for all SLOs. Unfortunately, we had poor faculty participation in committee meeting assessments, so not all continuing students were assessed. In future additional reminders will be given to faculty to increase participation.

Comments on part II: Reviewers of previous assessment had no suggestions to incorporate into this assessment. This is the first year that we have had data for SLO's 2-5. Because this is a small program, it is difficult to draw conclusions from one year of data. That being said, it does appear that our students are performing at the desired level by the end of the program and at least some are not performing at the desired level earlier in the program. At this time we are not proposing any changes, but instead are increasing the sample to better measure the progression of students. With a larger sample, we may be able to break down continuing students into cohorts to track changes through the program.

APPENDIX 1:

Student Learning Outcomes Evaluation

Graduate Programs in Natural Sciences MS in Biology Program assessment rubric

	Excellent	Proficient	Developmental	Ineffective
Mastery of Scientific Method	<ul style="list-style-type: none"> -Significance compelling -Hypothesis testable and fully supported by background -Aims/predictions fully test hypothesis -Methods achieve aims/test predictions entirely -Methods include robust controls and statistics -Interpretations elucidate hypothesis and significance 	<ul style="list-style-type: none"> -Significance clearly communicated -Hypothesis testable and mostly supported by background -Aims/predictions test the hypothesis -Methods achieve aims/test predictions -Methods include critical controls and adequate statistics -Interpretations elucidate hypothesis and touch on significance 	<ul style="list-style-type: none"> -Significance partially communicated -Hypothesis testable -Aims/predictions test the hypothesis are not compelling -Methods not fully connected to aims/predictions -Methods missing controls or use incorrect statistics -Interpretations relate to the hypothesis but not significance 	<ul style="list-style-type: none"> -Significance not clearly communicated -Hypothesis is trivial or untestable -Aims/predictions do not test hypothesis -Methods do not achieve aims/test predictions -Methods lack controls and statistics -Interpretations do not relate the hypothesis or significance
Dissemination of Scientific Products	<ul style="list-style-type: none"> -Written work is clear and concise -Presentation is dynamic and confident. -Graphs are informative -Products follow correct format. 	<ul style="list-style-type: none"> -Written work requires some editing -Presentation lacks flow -Graphs are unclear -Some incorrect formatting 	<ul style="list-style-type: none"> -Written work is rambling or lacks detail -Presentation is unclear or disorganized. -Graphs are incorrect -Incorrect formatting prevalent 	<ul style="list-style-type: none"> -Written work grammatically incorrect -Presentation is poor -Graphs are absent -Not in scientific format
Utilization of Literature	<ul style="list-style-type: none"> -Systematic review of literature -Can utilize and integrate multiple sources to answer questions 	<ul style="list-style-type: none"> -Some important literature missing -Can give individual sources without integration 	<ul style="list-style-type: none"> -Literature review is incomplete -Can give some but insufficient examples from the literature 	<ul style="list-style-type: none"> -Literature review missing -Does not have a grasp of the literature
Development of a Relevant Knowledge Base	<ul style="list-style-type: none"> -Easily draws on knowledge base to answer questions -Understands and utilizes methods in field of interest -Is an expert in the field 	<ul style="list-style-type: none"> -Can apply outside knowledge to answer questions -Understands common methods in field of interest -Is well versed in field 	<ul style="list-style-type: none"> -Can apply outside knowledge with coaxing -Is somewhat familiar with the field -Is familiar with methods from field of interest, but does not fully understand them 	<ul style="list-style-type: none"> -Cannot answer questions about research topic -Is unfamiliar with common methods in field of interest -Is not familiar with field
Professionalism and Self Responsibility	<ul style="list-style-type: none"> -Complete ownership -Conducts research independently -Schedules meetings without prompting from faculty -Makes and meets deadlines for products 	<ul style="list-style-type: none"> -Partial ownership -Conducts research with some oversight from faculty -Schedules meetings on request -Meets deadlines for products 	<ul style="list-style-type: none"> -Little ownership -Conducts research with faculty oversight -Fails to schedule meetings promptly -Does not meet deadlines for products 	<ul style="list-style-type: none"> -No ownership -Relies on others to conduct research -Does not have regular meetings -Does not produce products

 GPNS MS in Biology	Excellent	Proficient	Developmental	Ineffective	Not Evaluated
	Scientific Method				
Scientific Products					
Literature					
Knowledge Base					
Responsibility					

Student Name: _____

Setting Evaluated: Committee Meeting / Thesis Defense

Semester/Year: _____

This form is to be completed by graduate committee at each committee meeting and by attending biology faculty at thesis defense or internship seminar. Data is to be compiled by the program director for programmatic assessment of student learning outcomes (SLOs).