

Degree Program Student Learning Report

Revised November 2019

Department of Biology

BS in Biology

For 2021-2022 Academic Year

PART 1

Degree Program Mission and Student Learning Outcomes

A. State the school, department, and degree program missions.

University Mission	School Mission	Department Mission	Degree Program Mission
Our mission is to ensure students develop the skills and knowledge required to achieve professional and	Central to the mission of the School is the preparation of students to achieve professional and personal goals in their respective disciplines	The mission of the Department of Biology at Rogers State University is to support students in their pursuit	Under the Bachelor of Science in Biology, there are three emphases: the Medical/Molecular emphasis, the Environmental Conservation

University Mission	School Mission	Department Mission	Degree Program Mission
personal goals in dynamic local and global communities.	and to enable their success in dynamic local and global communities. Our strategy is to foster an academic setting of diverse curricula that inherently incorporates an environment of service and collegiality:	of knowledge in biology and life science.	emphasis, and General Biology emphasis. The four-year program seeks to develop a biologist well-grounded in an area of emphasis. The student integrates mathematical and physical science concepts into biology. The student uses the scientific method as well as evaluates others' use of this method of inquiry. He/she writes and presents scientific papers and reports. The degree is augmented with individual research and internships for successful postgraduate and professional careers.

B. Align school purposes, department purposes, and program student learning outcomes with their appropriate University commitments.

University Commitments	School Purposes	Department Purposes	Student Learning Outcomes
To provide quality associate, baccalaureate, and graduate degree opportunities and educational experiences which foster student	The School offers innovative degrees, which focus upon developing skills in oral and written communication, critical thinking,	To increase the student's critical thinking and reasoning abilities.	1. To demonstrate an understanding of the fundamental processes of life.

University Commitments	School Purposes	Department Purposes	Student Learning Outcomes
excellence in oral and written communications, scientific reasoning, and critical and creative thinking.	creativity, empirical and evidenced-based inquiry, experimental investigation and theoretical explanation of natural phenomena, and innovative technology.	To prepare a student to matriculate into a four-year degree program in math or science related fields or graduate.	2. To apply scientific method and interpret current technology and research techniques relating to the biological sciences.
To promote an atmosphere of academic and intellectual freedom and respect for diverse expression in an environment of physical safety that is supportive of teaching and learning.			
To provide a general liberal arts education that supports specialized academic programs and prepares students for lifelong learning and service in a diverse society.	The School educates its majors to think independently and have the knowledge, skills, and vision to work in all types of situations and careers and communicate with all types of people.	To increase student understanding and appreciation of the biological world and his/her ability to apply this understanding to his/her personal and professional life.	3. To be adequately prepared for transition into a productive professional career.

University Commitments	School Purposes	Department Purposes	Student Learning Outcomes
		To increase the student's ability to interpret and understand his/her world.	4. To demonstrate an understanding of the fundamental processes of life. (This outcome meets two different departmental purposes).
To provide students with a diverse, innovative faculty dedicated to excellence in teaching, scholarly pursuits, and continuous improvement of programs.	The School fosters a community of scholars among the faculty and students of the institution.		
To provide university-wide student services, activities and resources that complement academic programs.			
To support and strengthen student, faculty and administrative structures that promote shared governance of the institution.			
To promote and encourage student, faculty, staff and community interaction in a positive academic climate that creates opportunities for cultural, intellectual and personal	The School will offer and promote artistic, scientific, cultural, and public affairs events on the campus and in the region.	To increase the student's awareness of the benefits of incorporation of technology into science studies.	5. To apply scientific method and interpret current technology and research techniques relating to the biological sciences (This outcome meets two different departmental purposes).

University Commitments	School Purposes	Department Purposes	Student Learning Outcomes
enrichment for the University and the communities it serves.		To serve as a resource for the community; utilizing the expertise of the faculty.	

PART 2

Revisit Proposed Changes Made in Previous Assessment Cycle

Revisit each instructional/assessment change proposed in Part 5 of the degree program SLR for the preceding year. Indicate whether the proposed change was implemented and comment accordingly. Any changes the department implemented for this academic year, but which were not specifically proposed in the preceding report, should also be reported and discussed here. Please note if no changes were either proposed or implemented or this academic year.

Proposed Change	Implemented? (Y/N)	Comments
1. We will look for another outside exam which measures our students' learning more acutely.	Y	To accurately measure our students' learning in three different degree emphases in the BS Biology program, we have compared our current ETS major field for biology test to other alternative options. Although our current ETS test has some limitations, it seems to be the best fit for our purpose among other options. We decided to keep the ETS major field for biology test.

2. We will develop rubrics for BIOL-4801 Biology Research Method course.	Y	We have adopted and used common rubrics to evaluate our students' research presentation.
3. We will develop an online post-graduate survey.	Y	We are going to launch an online post-graduate survey in summer 2022.

PART 3

Response to University Assessment Committee Peer Review

The University Assessment Committee provides written feedback on departmental assessment plans through a regular peer review process.

This faculty-led oversight is integral to RSU's commitment to the continuous improvement of student learning and institutional effectiveness. UAC recommendations are not compulsory and departments may implement them at their discretion. Nevertheless, respond below to each UAC recommendations from last year's peer review report. Indicate whether the recommendation was implemented and comment accordingly. Please indicate either if the UAC had no recommendations or if the program was not subject to review in the previous cycle.

Peer Review Feedback	Implemented (Y/N)	Comments
Department of Biology was not subject to review in the previous cycle.	N/A	

PART 4

Evidence of Student Learning

Evidence and analyze student progress for each of the student learning outcomes (same as listed in Part I B above) for the degree program. See the *Appendix* for a detailed description of each component. Note: The table below is for the first program learning outcome. Copy the table and insert it below for each additional outcome. SLO numbers should be updated accordingly.

A.					
Student Learning Outcome					
SLO #1: To demonstrate an understanding of the fundamental processes of life					
B.	C.	D.	E.	F.	G.
Assessment Measure	Performance Standard	Sampling Method	Sample Size (n)	Results	Standard Met (Y/N)
1a. Composite Score of Education Testing Service (ETS) Major Field Assessment National Exam for Biology	1a. The program mean will be within one standard deviation of the normative mean on Major Fields Test in biology.	1a All students in BIOL 4801 classes in Fall 2021 and Spring 2022.	1a. 28	1a. Across both degree options in biology program (Medical Molecular option and Environmental Conservation option), students averaged 144±10 while the national average was 153±13. Student scores ranging over 140 with 19 of 28 students (68%) (The score 140 is one standard deviation below the national mean).	1a. Y
1b. Subscores of Education Testing Service (ETS) Major	ETS exam reports four subscores: (subset #1) Cell	1b. All students in BIOL 4801.	1b. 28	1b. The average of our students, the national average and its standard deviation, and number of students within	1b. Y

A.

Student Learning Outcome

SLO #1: To demonstrate an understanding of the fundamental processes of life

B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)
Field Assessment National Exam for Biology	Biology; (subset #2) Molecular Biology & Genetics; (subset #3) Organismal Biology; and (subset #4) Population Biology , Evolution, & Ecology. Our measure is that three of the four sub- scores for the exam will be within one standard deviation of their normative means.			<p>one standard deviation of the mean for each subset are listed below.</p> <p>Subset #1 – Cell Biology: Our students had a mean score of 45 for the ETS compared with the national average 52±14. 17/28 students were within one standard deviation of the national mean.</p> <p>For subset #2 – Molecular Biology and Genetics: Our students had a mean score of 44 for the ETS compared with the national average 53±14. 19/41 students were within one standard deviation of the national mean.</p> <p>For subset #3 – Organismal Biology: Our students had a mean score of 45 for the ETS compared with the national average 52±13. 22/28 students were within one standard deviation of the national mean.</p>	

A.

Student Learning Outcome

SLO #1: To demonstrate an understanding of the fundamental processes of life

B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)
1c. Survey in BIOL 4801 - Biology Research Methods II assessing understanding of program objective 1.	1c. On the survey, 70% of our students will rank themselves as a 4 or greater (Likert scale from 1 to 5) on their understanding of the fundamental processes of life.	1c. All students in the BIOL 4801 classes in Spring 2022. (We missed collecting the data in Fall 2021 and one student's data in Spring 2022.)	1c. 14	<p>For subset #4 – Population Biology, Evolution, and Ecology: Our students had a mean score of 44 for the ETS compared with the national average 52 ± 13. 18/28 students were within one standard deviation of the national mean.</p> <p>1c. Questions were based on a Likert scale from 1 to 5, with 1 being very poor and 5 being excellent. Result average was 4.1 ± 0.52 (AVE \pm SD). Of the 14 students surveyed, 3 (22%) ranked themselves as 5 (excellent) and 10 (71%) ranked themselves as 4 (Good), and 1 (7%) ranked themselves as a 3 (average) on mastery of program objective 1.</p>	1c. Y

H.

A. Student Learning Outcome					
SLO #1: To demonstrate an understanding of the fundamental processes of life					
B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)
Conclusions					
<p>1a and 1b. According to the results of the Education Testing Service (ETS) Major Field Assessment National Exam, we are accomplishing our goals both in composite and subscores. The National Mean had been derived from the scores of 15,595 students who attend 377 different universities and colleges in the US.</p> <p>1c. 93% indicated understanding of program objective 1. Our goal of 70% was reached. These results are an indirect measure and are of our student's perception of whether they think they understand the SLO #1. Although subjective, it is important to know whether our students believe they are learning.</p>					

A.

Student Learning Outcome

SLO #2: To apply scientific method and interpret current technology and research techniques relating to the biological sciences.

B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)
2a. 2a. Survey in BIOL 4801, Biology Research Methods II, covering understanding of program objective 2.	2a. 2a. 70% of students will indicate 4 or greater (on a Likert scale) understanding of program objective 2.	2a. All students in the BIOL 4801 classes in Spring 2022. (We missed collecting the data in Fall 2021 and one student's data in Spring 2022.)	2a. 14	<p>2a. Questions were based on a Likert scale from 1 to 5 with 1 being very poor and 5 being excellent. Of the 14 students surveyed,</p> <p>2a-1. To apply scientific method: 6 (43%) ranked themselves as 5 (excellent), 5 (36%) ranked themselves as 4 (Good), and 3 (21%) ranked themselves as a 3 (average) on mastery of program objective 2. Overall average for all students surveyed was 4.2 ± 0.77.</p> <p>2a-2. To interpret current technology and research techniques: 2 (14%) ranked themselves as 5 (excellent), 8 (57%) ranked themselves as 4 (Good), and 4 (29%) ranked themselves as a 3 (average) on mastery of program objective 2. Overall average for all students surveyed was 3.8 ± 0.58.</p>	2a. Y

A.

Student Learning Outcome

SLO #2: To apply scientific method and interpret current technology and research techniques relating to the biological sciences.

B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)
2b. BIOL-4801, Biology Research Methods II, research project paper of respective research findings.	2b. 80% of students will earn a grade of "B" on BIOL 4801 (written paper, presentation, comprehensive research). Grade assigned by instructor and mentor.	2b. All students in BIOL 4801 Fall 2021 and Spring 2022.	2b. 30	2b. Over 80% (26/30=86%, 2 Incomplete, 1 withdraw) of students completing Research Methods II in Fall 2021 and Spring 2022 earned a grade of B or higher on BIOL 4801.	2b. Y
2c. BIOL-3024, Genetics Comprehensive Pre-post exam	2c. 70% of students will score 60% or above on post-test.	2c. All students in BIOL 3204 Fall 2021 and Spring 2022.	2c. 50	2c. The pre-test was administrated on the first class, and the post-test was given together with the final exam. The average pre-test scores were 40%, and post-test scores were 70%. 80% (40/50=80%) of students completing	2d. Y

A. Student Learning Outcome					
SLO #2: To apply scientific method and interpret current technology and research techniques relating to the biological sciences.					
B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)
				Genetics in Fall 2021 and Spring 2022 earned 60% or higher on the post-test. However, all students (50/50=100%) completed Genetics in Fall 2021 and Spring 2022 increased their post-test scores comparing to pre-test scores. Mean changes of pre-post test scores were 30% increase.	
H. Conclusions					
<p>2a. 97% (2a-1) and 88% (2a-2) students indicated understanding of program objective 2. Our goal of 70% was reached. These results are an indirect measure and are of our student's perception of whether they think they understand SLO #2. No new instructional changes are anticipated.</p> <p>2b. The mentoring process between faculty mentor/class instructor and mentee is providing sufficient feedback to students as they prepare the final version of their papers. Students are able to present their research findings in a comprehensive manner, as a combined result of efforts by the students, faculty mentor, and class instructor. We are accomplishing our goal. No new instructional changes are anticipated.</p>					

A.

Student Learning Outcome

SLO #2: To apply scientific method and interpret current technology and research techniques relating to the biological sciences.

B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)
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2c. 80% students are 60% or above on post-test. We are accomplishing our goal. In addition, all students (100%) increased their post-test exam scores comparing to pre-exam scores with an average 29% increase (Range: 11% - 52% increase). No new instructional changes are anticipated.

A.**Student Learning Outcome**

SLO #3: To be adequately prepared for transition into a productive professional career.

B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)
3a. A post-graduate survey, asking about their transition from RSU into post-graduate endeavors (job, internship, graduate school, professional school). The survey will be administered to graduates.	3a. Of the surveys returned, 70% of the past graduates will indicate a score of 4 on a scale of 1 to 5 (5 being high) for their transitions from RSU in post-graduate endeavors (job, internship, graduate school, professional school).	3a. The biology department will administer a post-graduate survey by e-mail about their transition from RSU into post-graduate endeavors (job, internship, graduate school, professional school).	3a. N/A	3a. Will be conducted during this summer, 2022	3a. N/A
3b. Students' activities post-graduation.	3b. 80% of reporting students are working in biology field or continuing education in biology.	3b. The biology faculty and staff informally collect information about	3b. 402	3b. Since May 2003 we have had over 565 graduates with BS in Biology. Of these students, we have been able to track 402 graduates. These 402 graduates have been placed in the following:	3b. Y

A.

Student Learning Outcome

SLO #3: To be adequately prepared for transition into a productive professional career.

B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)
		student's activities after graduation.		Medical School 56 Graduate Programs-non-health professional 29 Physicians Assistant 22 Env/Eng/Chem Technicians/Analysts 16 Pharmacy 33 Private Sector- non-STEM related 14 Private Sector-STEM related 11 Nursing 14 Graduate School-Environmental-Biomedical Science 10 Dental 8 Veterinary 7 Public/Higher education 6 Medical Laboratory Technology 5 Chiropractic School 5 EMT 4 Physical Therapy 5 Optometry 2 Occupational Therapy 2 Physical Therapy Assistant 2	

A.

Student Learning Outcome

SLO #3: To be adequately prepared for transition into a productive professional career.

B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)
				Dental Assistant/Hygiene 6 Env/Eng/Chem Technicians 55 Natural Resource Positions 26 Graduate School 17 Careers unrelated to degree 14 Environmental/Engineering Consulting 12 Public/Higher Education 9 Law Enforcement (Wildlife and Public) 8 Health Care Industry 4	

H.

Conclusions

3a. We have not collected this data for last four years. We will launch online survey this summer.

3b. This data was updated in spring 2022.

PART 5

Proposed Instructional or Assessment Changes

Learning outcomes assessment can generate actionable evidence of student performance that can be used to improve student success and institutional effectiveness. Knowledge of student strengths and weakness gained through assessment can inform faculty efforts to improve course instruction and program curriculum. Below discuss potential changes the department is considering which are aimed at improving student learning or the assessment process. Indicate which student learning outcome(s) will be affected and provide a rationale for each proposed change. These proposals will be revisited in next assessment cycle.

Proposed Change	Applicable Learning Outcomes	Rationale and Impact
No instructional/ Assessment changes in this period.		

PART 6

Summary of Assessment Measures

A. How many different assessment measures were used?

8

B. List the direct measures (see appendix):

Comprehensive exams, Class assignments, Pre/post exams, Third-party exam (ETS Major Field Test for Biology), Senior thesis of capstone projects






C. List the indirect measures (see appendix):

Graduate exit interviews, Job placement statistics, Student and alumni surveys that assess perceptions of the program



PART 7

Faculty Participation and Signatures

A. Provide the names and signatures of all full time and adjunct faculty who contributed to this report.

Faculty Name	Assessment Role	Signature
Dr. Jin Seo	Prepared report, collected data, & analyzed data	 5/18/22
Dr. Jerry Bowen	Collected data & reviewed report	 21 MAY 2022
Dr. Hannah King	Reviewed report	Hannah M King
Mr. Rance Kingfisher	Reviewed report	
Dr. Jae-Ho Kim	Collected data & reviewed report	Not Available
Ms. Cheyanne Olson	Reviewed report	
Dr. Mark Peaden	Collected data & reviewed report	
Dr. Craig Zimmermann	Reviewed report	Craig Zimmermann

B. Reviewed by:

Titles	Name	Signature	Date
Department Head	Dr. Jerry Bowen		31 MAY 2022
Dean	Dr. Keith Martin		4/3/22