Degree Program Student Learning Report

Revised May 2020

Select Academic Department

BS in Biology

For 2022-2023 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 personal goals in dynamic local and global communities.	Central to the mission of the School is the preparation of students to achieve professional and personal goals in their respective disciplines 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:	The mission of the Department of Biology at Rogers State University is to support students in their pursuit of knowledge in biology and life science.	Under the Bachelor of Science in Biology, there are three emphases: the Medical/Molecular emphasis, the Environmental Conservation 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

University Mission	School Mission	Department Mission	Degree Program Mission
			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 excellence in oral and written communications, scientific reasoning and critical and creative thinking.	The School offers innovative degrees, which focus upon developing skills in oral and written communication, critical thinking, creativity, empirical and evidenced-based inquiry, experimental investigation and theoretical explanation of natural phenomena, and innovative technology.	To increase the student's critical thinking and reasoning abilities. To prepare a student to matriculate into a four-year degree program in math or science related fields or graduate.	1 To demonstrate an understanding of the fundamental processes of life. 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. To increase the student's ability to interpret and understand his/her world.	3. To be adequately prepared for transition into a productive professional career. 1. To demonstrate an understanding of the fundamental processes of life.

University Commitments	School Purposes	Department Purposes	Student Learning Outcomes
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 enrichment for the University and the communities it serves.	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. To serve as a resource for the community; utilizing the expertise of the faculty.	2. To apply the scientific method and interpret current technology and research techniques relating to the biological sciences

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

No instructional or assessment changes were proposed in the previous period.		

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
The 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. Assessment Measure	**C. Performance Standard**	**D. Sampling Method**	**E. Sample Size (n)**	**F. Results**	**G. Standard Met (Y/N)**
1a. Composite Score of Education Testing Service (ETS) Major Field Tests for Biology	1a. The program mean will be within one standard deviation of the national mean on Major Fields Test in biology. (Used 2022 Comparative Data which include 418 domestic institutions, 32,959 Examinees tested between Sep. 2018-Jun. 2022)	1a. All students in BIOL 4801 classes in Fall 2022 and Spring 2023. (Four out of the total 43 students enrolled in both classes did not participate in the ETS test and the survey.)	1a. 39	1a. Across three-degree options in biology program (Medical Molecular option, Environmental Conservation option, and General Biology option), students averaged 146±12 while the national average was 152±13. Student scores ranged over 139 with 28 of 39 students (72%) (The score 140 is one standard deviation below the national mean).	1a. Y
1b. Subscores of Education Testing Service (ETS) Major Field Tests for Biology	ETS exam reports four subscores: (subset #1) Cell 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	1b. All students in BIOL 4801.	1b. 39	1b. The number of Students who scored within one standard deviation of the national mean for at least three of the four sub-scores of the test was 29/39 (72%). The average of our students, the national average and its standard deviation, and number of students within one standard deviation of the mean for each subset are listed below. Subset #1 – Cell Biology: Our students had a mean score of 48 for the ETS compared	1b. Y

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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)**
	will be within one standard deviation of the national mean.			with the national average 52±14. 32/39 students were within one standard deviation of the national mean. For subset #2 – Molecular Biology and Genetics: Our students had a mean score of 46 for the ETS compared with the national average 53±14. 28/41 students were within one standard deviation of the national mean. For subset #3 – Organismal Biology: Our students had a mean score of 47 for the ETS compared with the national average 51±13. 31/39 students were within one standard deviation of the national mean. For subset #4 – Population Biology, Evolution, and Ecology: Our students had a mean score of 46 for the ETS compared with the national average 51±13. 27/39 students were within one standard deviation of the national mean.	
1c. Survey in BIOL 4801 - Biology Research Methods II assessing	1c. On the survey, 70% of our students will rank themselves as a 4 or greater	1c. All students in BIOL 4801 classes in Fall 2022 and Spring 2023.	1c. 39	1c. Questions were based on a Likert scale from 1 to 5, with 1 being very poor and 5 being excellent. Result average was 3.97±0.67 (AVE ± SD). Of the 39 students	1c. 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)**
understanding of program objective 1.	(Likert scale from 1 to 5) on their understanding of the fundamental processes of life.			surveyed, 8 (21%) ranked themselves as 5 (excellent) and 22 (56%) ranked themselves as 4 (Good), and 9 (23%) ranked themselves as a 3 (average) on mastery of program objective 1.	

H. Conclusions
1a and 1b. According to the results of the Education Testing Service (ETS) Major Field Tests for Biology, we are accomplishing our goals both in composite and subscores. The National Mean had been derived from the scores of 32,959 students who attend 418 different universities and colleges in the US. 1c. 77% 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.

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. Survey in BIOL 4801, Biology Research Methods II, covering understanding of program objective 2.	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 Fall 2022 and Spring 2023.	2a. 39	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, 2a-1. To apply scientific method: 14 (36%) ranked themselves as 5 (excellent), 20 (51%) ranked themselves as 4 (Good), and 5 (13%) ranked themselves as a 3 (average) on mastery of program objective 2. Overall average for all students surveyed was 4.23±0.67. 2a-2. To interpret current technology and research techniques: 12 (31%) ranked themselves as 5 (excellent), 14 (36%) ranked themselves as 4 (Good), and 13 (33%) ranked themselves as a 3 (average) on mastery of program objective 2. Overall average for all students surveyed was 3.97±0.81.	2a-1. Y 2a-2. N
2b. BIOL-4801, Biology Research Methods II, research project paper of	2b. 80% of students will earn a grade of "B" on BIOL 4801 (written paper, presentation,	2b. All students in BIOL 4801 Fall 2021 and Spring 2022.	2b. 39	2b. Over 80% (39/39=86%, 1 C, 3 F, 2 Incomplete) of students completing Research Methods II in Fall 2022 and Spring 2023 earned a grade of B or higher on BIOL 4801.	2b. 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)**
respective research findings. 2c. BIOL-3024, Genetics Comprehensive Pre-post exam	comprehensive research). Grade assigned by instructor and mentor. 2c. 70% of students will score 60% or above on post-test.	2c. All students in BIOL 3204 Fall 2022 and Spring 2023.	2c. 41	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 40.9%, and post-test scores were 68.6%. 73% (30/41=73%) of students completing Genetics in Fall 2022 and Spring 2023 earned 60% or higher on the post-test. However, all students 41/41=100%) completed Genetics in Fall 2022 and Spring 2023 increased their post-test scores comparing to pre-test scores. Mean changes of pre-post test scores were 27.7% increase.	2d. Y

H. Conclusions
2a. 87% (2a-1) and 67% (2a-2) students indicated understanding of program objective 2. Our goal of 70% was reached for 2a-1 but not for 2a-2. We will implement a new three-semester sequence of biology research courses to expose our students to more current technology and research techniques in the biological sciences. These results are an indirect measure and are of our student's perception of whether they think they understand SLO #2.

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. 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, which is a combined result of efforts of the students, faculty mentors, and class instructors. We are successfully accomplishing our goal. No new instructional changes are anticipated. 2c. 80% of students achieved a score of 60% or above on the post-test of Genetics. We are successfully accomplishing our goal. Additionally, all students (100%) improved their post-test exam scores compared to their pre-exam scores, with an average increase of 28% (range: 3% - 50% 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. The surveys will be conducted during this summer, 2023.	3a. The survey will be administered to graduates.
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 student's activities after graduation.	3b. 339	3b. Since May 2003 we have had over 613 graduates with BS in Biology. Of these students, we have been able to track 339 graduates. These 339 graduates have been placed in the following: Medical School 56 Physicians Assistant 22 Pharmacy 35 Dental 8 Veterinary 7 Physical Therapy 5 Nursing 14 Optometry 2 Occupational Therapy 2	3b. Students' activities post-graduation.

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)**
				Physical Therapy Assistant 2 Dental Assistant/Hygiene 6 Health Care Industry 4 Medical Laboratory Technology 5 Chiropractic School 5 EMT 5 Public/Higher Education 9 Env/Eng/Chem Technicians 56 Graduate Programs-non-health professional 32 Law Enforcement (Wildlife and Public) 8 Careers unrelated to degree 15 Natural Resource Positions 26 Private Sector- non-STEM related 15	
H. Conclusions					
3a. We have not collected this data for the last five years due to a lack of resources. However, we will be launching an online survey in Summer 2023. 3b. This data was updated in Spring 2023.					

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
1. We will implement a new three-semester sequence of biology research courses.	2a-2	Our students will be exposed to the latest technology and research techniques in the field of biological sciences. This update will instill greater confidence in our students regarding this learning outcome.

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 Tests for Biology), Senior thesis of capstone projects

C. List the indirect measures (see appendix):
Graduate surveys, 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	5/26/2023
Dr. Jerry Bowen	Reviewed report	26 May 2023
Dr. Jae-Ho Kim	Collected data & reviewed report	5/28/2023
Dr. Hannah King	Reviewed report	5/30/23
Mr. Rance Kingfisher	Reviewed report	5/27/23
Ms. Cheyanne Olson	Collected data & reviewed report	5/29/23
Dr. Mark Peaden	Collected data & reviewed report	
Dr. Craig Zimmermann	Reviewed report	5/24/23

B. Reviewed by:

Titles	Name	Signature	Date
Department Head	Dr. Jerry Bowen		
Dean	Dr. Keith Martin	Keith N. Martin	5/31/23