Degree Program Student Learning Report
Revised August 2017

Department of Biology

BS in Biology

For 2016-2017 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 two emphases: the Medical/Molecular emphasis and the Environmental Conservation emphasis. The four-year program seeks to develop a biologist well- grounded in either 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 excellence in oral and written	The School offers innovative degrees, which focus upon developing skills in oral and written communication, critical thinking, creativity, empirical and evidenced-based	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
communications, scientific reasoning and critical and creative thinking.	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 program sand 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. 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 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.	5. To apply scientific method and interpret current technology and research techniques relating to the biological sciences (This outcome meets two different departmental purposes).

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
Dr. Overall will give the Bartlesville students the ability to take the courses previously offered along with Microbiology. This new course offering in Bartlesville will greatly benefit our pre-nursing students.	Y	Total of 7 Biology courses are offered in the Bartlesville campus and 119 students registered for the courses including Environmental Biology, General Cell Biology, Anatomy and Physiology, and Microbiology. 14 students (among total enrollment of 19) took the microbiology together with other courses. [Note: none of these are new courses that have never been offered, they were previously offered with adjunct faculty, Claremore-based faculty and Dr. Register]
Moreover, Dr. Overall's research experience will benefit our students' senior capstone research projects.	N	Dr. Overall taught mainly introductory courses during the 2016-2017 school year. Thus, she didn't have chances to meet and mentor seniors. Once her research is further established, and students' interest is aligned to hers, she will guide more senior research projects.
We add BIOL-3024, Genetics Comprehensive Pre-post exam for intermediate assessment measure before BIOL-4801 Biology Research Methods II. This pre/post test contains multiple choice questions and will be assessed in the BIOL-3204 class.	Y	This pre/post tests will serve as an intermediate assessment measure of our students (both degree options) since they typically take BIOL-3202 in sophomore or junior year while they take BIOL-4801 in senior year.

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.		

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. <u>Note</u>: 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. Survey in BIOL 4801 - Biology Research Methods II assessing understanding of program objective 1.	1a. On the survey, 70% of our students will rank them-selves as a 4 or greater (Likert scale from 1 to 5) on their understanding of the fundamental processes of life.	1a. All students in the BIOL 4801 classes in Fall 2016 & Spring 2017	1a. 46	1a. Questions were based on a Likert scale from 1 to 5, with 1 being very poor and 5 being excellent. Result average was 4.8. Of the 46 students surveyed, 13 ranked themselves as 5 (excellent) and 27 ranked themselves as 4 (Good), and 6 ranked themselves as a 3 (average) on mastery of program objective 2. This result is comparable to last year's result, which had the sample size of 31. 12 ranked themselves as 5, 18 ranked themselves as 4, and 1 ranked themselves as a 3. The last year average was 4.4.		1a. Y
1b. Education Testing Service Major Field Assessment Exam for Biology in BIOL 4801, Biology Research Methods II.	1b. The program mean will be within one standard deviation of the normative mean on Major Fields Test in biology.	1b All students in BIOL 4801.	1b. 48	1b. Our students had a mean score of 143±10 for the ETS compared with the national average 153±13. Student scores ranging over 140 with 29 of 48 students (within one standard deviation of the national mean).		1b. Y
1c. Education Testing Service Major Field Assessment Exam for Biology in BIOL 4801,	1c. ETS exam reports four sub-scores in; a) Cell Biology, b) Molecular Biology & Genetics, c)	1c. All students in BIOL 4801.	1c. 48	1c. Across both degree programs, students averaged 143±10 while the national average was 153±13. The average of our students, the national average, and distribution of student scores within one standard		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)
Biology Research Methods II.	Organismal Biology, and d) 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.			deviation of the mean for each subset are listed below. Subset #1 – Cell Biology: Our students had a mean score of 46±13 for the ETS compared with the national average 53±12.9. 33/48 students were within one standard deviation of the National Mean. For subset #2 – Molecular Biology and Genetics: Our students had a mean score of 44±13 for the ETS compared with the national average 52.7±13.3. 29/48 students were within one standard deviation of the National Mean. For subset #3 – Organismal Biology: Our students had a mean score of 43±11 for the ETS compared with the national average 53.3±12.9. 28/48 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 44±12 for the ETS compared with the national average 52.1±13.3. 32/48 students were within one standard deviation of the National Mean.	

H.
Conclusions

1a. 90% 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 or not they think they have an understanding of outcome #1. Although subjective, it is important to know whether or not our students believe they are learning. According to our results, we are accomplishing our goal. This also allows us to compare a student's perception of their knowledge to a more objective method (the ETS). No instructional changes are anticipated.

1b. Our average student score was in one standard deviation of the national mean. No new instructional changes are anticipated.

1c. In regards to cumulative ETS scores across all subsets, our students performed in one standard deviation of the national mean. No new instructional changes are anticipated.

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 2016 & Spring 2017	2a. 38 students surveyed.	2a. Questions were based on a Likert scale from 1 to 5 with 1 being very poor and 5 being excellent. Of the 45 students surveyed 19 ranked themselves as 5 (excellent) and 22 ranked themselves as 4 (Good), and 4 ranked themselves as a 3 (average) on mastery of program objective 2. Overall average for all students surveyed was 4.3.	2a. Y
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 the written paper for BIOL 4801. Grade assigned by instructor and mentor.	2b. All students in BIOL 4801 Fall 2016 and Spring 2017.	2b. 38	2b. Over 80% (35/38=92%) of students completing Research Methods II in Fall and Spring 2016-2017 earned a grade of B or higher on the written paper	2b. Y
2c. BIOL-4801, Biology Research Methods II, oral presentation of respective research findings.	2c. 80% of students will earn a grade of "B" on the presentation for BIOL 4801. Grade assigned by Biology Faculty.	2c. All students in BIOL 4801 Fall 2016 and Spring 2017	2c. 38	2c. Over 80% (37/38=97%) of students completing Research Methods II in Fall and Spring 2016/2017 earned a grade of B or higher on the research presentation	2c. Y
2d. BIOL-3024, Genetics Comprehensive Pre-post exam This exam was administrated with the pre-test given on first class and the post-test given at time of final exam.	2d. 70% of students will score 70% or above on post-test.	2d. Given to all students in both Fall 2016 and Spring 2017.	2d. 52	2d. The average pre-test scores were 38.8%, and post-test scores were 77.3%. Over 70% (37/52=71%) of students completing Genetics in Fall and Spring 2016/2017 earned 70% or higher on the post-test. All students (52/52=100%) completed Genetics in Fall and Spring 2016/2017 increased their post-test exam scores comparing to pre-exam scores. Average changes of pre-post scores were 38% increase.	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)

H.
Conclusions

2a. 81% 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 or not they think they have an understanding of outcome #2. Although subjective it important to know whether or not our students believe they are learning. According to our results, we are accomplishing our goal. No new instructional changes are anticipated.

2b. The mentoring process between faculty mentor and mentee is providing sufficient feedback to students as they prepare the final version of their papers. We are anticipating to develop a new rubric to grade the students' paper and presentation.

2c. Students are able to present their research findings in a comprehensive manner, as a combined result of efforts by the students and faculty mentors. No new instructional changes are anticipated.

2d. We did not propose this measure for last assessment cycle. However, most of our students take this course before biology research methods II and thus, we believe that this pre/post tests will well serve as an intermediate assessment of our students. 71% of students scored 70% or above on post-test, and 100% students improved pre-post exams with 38% increase.

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 consists of 21 questions, asking about their transition from RSU into post-graduate endeavors (job, internship, graduate school, professional school). The survey will be	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	3a. The Biology Faculty 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. 14	3a. We had 14 responses. 156 out of 168 responses (total 14 students X 12 different questions = 168 responses) were 4 or better on the Likert scale, a result of 92.8% in regards to 12 questions about RSU biology program. These results exceed our 70% criterion. Ten graduates currently work in biology-related fields; one graduate works in non-biology related field; and two graduates do not work.	3a. 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)
administered to graduates 2 and 5 years post-graduation. 3b. A survey to collect students' activities post-graduation. **The survey will be administered to graduates 2 and 5 years post-graduation.**	school, professional school). 3b. 80% of reporting students are working or continuing education in biology. 50% are in graduate or professional school.	3b. Biology faculty will administer a survey to collect information about student's activities post-graduation.	3b.241	3b. Since May 2003 we have had 387 students graduate with BS in Biology. Of these 387 students, we have been able to track 236 graduates. These 236 graduates have been placed in the following; 6 Dentistry 38 Medical School (D.O. and M.D.) 5 Chiropractor 15 Pharmacy 17 Education (K-16) 9 Medical Technician 20 Wildlife Conservation 32 Environmental Management 3 Water Quality, Forensics 23 Graduate School Programs 4 EMT 9 R.N. 7 Veterinarian 12 PA 3 PT 3 OT 12 Work in hospital 2 Pathology assistant 1 podiatry 1 Mortician 1 Doctor of Naturopathy 18 Other occupations, including businesses It is also important to note that not all professional schools require a degree and for this reason these numbers under represented the actual number of	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)
				RSU students enrolled or graduated from professional schools.	

H.
Conclusions

3a. In comparison to our previous SLR, our respondent rate of 16/33 was encouraging. We are now using ZIP online survey rather than hard copy mail survey in the hope of increasing our respondent rate.
Based on our student survey, our student responses exceeded our 70% criterion for preparedness for post-graduate careers, biology skills and knowledge and recommending our program to a friend. This would seem to suggest a high degree of student satisfaction with our degree program.

3b. This data suggests that 92% of our graduates are either working in the professional field of biology or are in graduate or professional school. This does meet our expected values of 80%. No new instructional changes are anticipated.

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
Recruit and train students for research internship, independent studies, and summer research programs.	To apply scientific method and interpret current technology and research techniques relating to the biological sciences.	Students better understand experimental science with long-term research projects. They will learn multiple new techniques and various instruments beyond classroom lab setting. Through hypothesis-driven research, they will experience not only new discoveries but also multiple failures, which will encourage them to further pursue as research scientists. We expect 3-5 students for an academic year.

Proposed Change	Applicable Learning Outcomes	Rationale and Impact

PART 6
Summary of Assessment Measures

A. How many different assessment measures were used?

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B. List the direct measures (see appendix):

Comprehensive exams, Class assignments, Pre/post exams, Third-party exams (field tests), Senior thesis or capstone projects
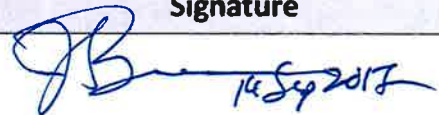
C. List the indirect measures (see appendix):

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. Jerry Bowen	Collected data, Analyzed data, & reviewed report	*14 Sep 2017*
Mrs. Claudia Glass	Collected data, Analyzed data, & reviewed report	*Claudia Glass 9-15-17*
Mr. Don Glass	Collected data, Analyzed data, & reviewed report	*Don Ce___ 9-18-17*
Dr. Sue Katz	Collected data, Analyzed data, & reviewed report	*9/18/17*
Dr. Jae-Ho Kim	Collected data, Analyzed data, & reviewed report	*9/15/2019*
Dr. Lisa Overall	Collected data, Analyzed data, & reviewed report	*09-18-17*
Dr. Jin Seo	Collected data, Analyzed data, Prepared report, & reviewed report	*9/14/2017*

Dr. Craig Zimmerman	Collected data, Analyzed data, & reviewed report	*Craig Zimmerman*	

B. Reviewed by:

Titles	Name	Signature	Date
Department Head	Dr. Jerry Bowen		14 Sep 2017
Dean	Dr. Keith Martin		9/18/17

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Appendix

Student Learning Outcome

Student learning outcomes are the observable or measurable results that are expected of a student following a learning experience. Learning outcomes may address knowledge, skills, attitudes, or values that provide evidence that learning has occurred. They can apply to a specific course, a program of study, or an institution. Outcomes should be worded in language that clearly implies a measurable behavior or quality of student work. Outcomes should also include Bloom's action verbs appropriate to the skill level of learning expected of students.

> Examples:
> *Students will be able to apply principles of evidence-based medicine to determine clinical diagnoses and implement acceptable treatment modalities.*
> *Students will be able to articulate cultural and socioeconomic differences and the significance of these differences for instructional planning.*

Assessment Measure

An assessment measure is a tool or instrument used to gather evidence of student progress toward an established learning outcome. Every program learning outcome should have at least one appropriate assessment measure. Learning outcomes are frequently complex, however, and may require multiple measures to accurately assess student performance. Assessment plans should try to incorporate a combination of direct and indirect assessment measures. Direct provide concrete evidence of whether a student has command of a specific subject or content area, can perform a certain task, exhibits a particular skill, demonstrates a certain quality in their work, or holds a particular value. Because direct measures tap into actual student learning, it is often viewed as the preferred measure type. Indirect measures assess opinions or thoughts about the extent of a student's knowledge, skills, or attitudes. They reveal characteristics associated with learning, but they only imply that learning has occurred. Both types of measures can provide useful insight into student learning and experiences in a program. Each also has unique advantages and disadvantages in terms of the type of data and information it can provide. Examples of common direct and indirect measures are listed below.

Direct Measures

- Comprehensive exams
- Class assignments
- Juried review of performances and exhibitions
- Internship or clinical evaluations
- Portfolio evaluation
- Pre/post exams
- Third-party exams such as field tests, certification exams, or licensure exams
- Senior thesis or capstone projects

Indirect Measures

- Graduate exit interviews
- Focus group responses
- Job placement statistics
- Graduate school placement statistics
- Graduation and retention rates
- Student and alumni surveys that assess perceptions of the program
- Employer surveys that assess perceptions of graduates
- Honors and awards earned by students and alumni.

Performance Standard
A performance standard is a clearly-defined benchmark that establishes the minimally-acceptable level of performance expected of students for a particular measure.

Examples:
At least 70% of students will score 70% or higher on a comprehensive final exam.
At least 75% of students will earn score a "Proficient" or higher rating on the Communicate Effectively rubric.

Sampling Method
Sampling method describes the methodology used for selecting the students that were assessed for a given measure. In some cases, such as most course-embedded measures, it is possible to assess all active enrolled students. In other cases, however, it is not feasible to measure the population of all potential students. In these cases, it is important that a well-designed sampling scheme be used to ensure the sample of students measured is an unbiased representation of the overall population. Where multiple instructors teach a particular course, care should be taken to assess students across all instructors, including adjuncts.

Examples:
All students enrolled in BIOL 4801 Biology Research Methods II
All majors graduating in the 2016-17 academic year.

Sample Size
Sample size is the number of students from which evidence of student learning was obtained for a given assessment measure.

Results
Results are an analytical summary of the findings arising from the assessment of student performance for a particular assessment measure. Typical presentation includes descriptive statistics (mean, median, range) and score frequency distributions.

Standard Met?
This is a simple yes/no response that indicates whether the observed level of student performance for a particular measure meets or exceeds the established standard. An N/A may be used where circumstances prevented the department from accurately assessing a measure.

Conclusion
The conclusion is a reflective summary and determination of the assessment results obtained for a specific learning outcome. Questions to consider in this section include the following:
- Does the assessment evidence indicate the learning outcome is being satisfactorily met?
- Where multiple measures are used for a single outcome, do the results present a consistent or contradictory pattern?
- What are the most valuable insights gained from the assessment results?
- What strengths and weaknesses in student learning do the results indicate?
- What implications are there for enhancing teaching and learning?
- How can the assessment process be improved?