

# Degree Program Student Learning Report

Revised August 2017

## Department of Biology

# AS in Biological Sciences

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.	The Associate of Science in Biological Science consists of the general education curriculum and the supporting science courses. In support of the mission of the University, the school, and the department, the degree seeks to develop a student with a broad and diverse background in science and general education.

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	The School offers innovative degrees, which focus upon	To increase the student's critical thinking and reasoning abilities.	1. Demonstrate an understanding of general cellular processes.

University Commitments	School Purposes	Department Purposes	Student Learning Outcomes
opportunities and educational experiences which foster student excellence in oral and written communications, scientific reasoning and critical and creative thinking.	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 prepare a student to matriculate into a four-year degree program in math or science related fields or graduate	<p>2. Apply understanding of the taxonomy, morphology, and physiology of the Animal and Plant Kingdoms.</p> <p>3. Demonstrate an understanding of the atom, compounds, matter, gases, solutions, atomic theory, bonding chemical reactions, and chemical kinetics.</p>
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.		<p>Demonstrate knowledge about the components and requirements of a safe lab environment</p> <p>To promote a positive learning environment in our classrooms and on campus.</p>	4. Demonstrate knowledge about the components and requirements of a safe lab environment.
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.	<p>To increase the student's understanding and appreciation of the biological world, and his/her ability to apply this understanding to his/her personal and professional life.</p> <p>To increase the student's ability to interpret and understand his/her world.</p>	
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.		

University Commitments	School Purposes	Department Purposes	Student Learning Outcomes
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.	

## 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
A new on-line safety quiz for each of students taking General Cellular Biology 1144 Laboratory will be required in the next cycle.	N	We have established 'Safety in the Lab' as the first topic of each semester. Unified lab handout and safety quiz are used by all the instructors including adjuncts, but we have not implemented on-line safety quiz yet.

### 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
N/A		This program was not reviewed in 2015-2016 academic year.

### 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: Demonstrate an understanding of General Cellular processes.					
B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)

**A.  
Student Learning Outcome**

SLO #1: Demonstrate an understanding of General Cellular processes.

<b>B. Assessment Measure</b>	<b>C. Performance Standard</b>	<b>D. Sampling Method</b>	<b>E. Sample Size (n)</b>	<b>F. Results</b>	<b>G. Standard Met (Y/N)</b>														
Comprehensive Post Exam	70% of students declaring an AS in Biology major will score 70% or above.	Administered to all students in General Cellular Biology (Biol. 1144) during both Fall and Spring terms but only the declared AS in Biology students was analyzed.	Fall 16 and Spring 17 8 students	<p>The total number of students in Biol. 1144 for both semesters was 425 students. Among them, we had only 8 that could be assessed for the AS in Biology. Average post test score was 55.3% and only 25% (2 students) scored above 70%.</p> <p style="text-align: center;">Below are our results from this assessment cycle.</p> <p style="text-align: center;"><b>Fall 16 and Spring 17 Post test Score Distribution</b></p> <hr style="width: 20%; margin: auto;"/> <table style="margin-left: auto; margin-right: auto;"> <tr><td>0-49%</td><td style="text-align: right;">3</td></tr> <tr><td>50-59%</td><td style="text-align: right;">3</td></tr> <tr><td>60-69%</td><td style="text-align: right;">0</td></tr> <tr><td>70-79%</td><td style="text-align: right;">0</td></tr> <tr><td>80-89%</td><td style="text-align: right;">2</td></tr> <tr><td><u>90-100%</u></td><td style="text-align: right;"><u>0</u></td></tr> <tr><td>Total</td><td style="text-align: right;">8</td></tr> </table>	0-49%	3	50-59%	3	60-69%	0	70-79%	0	80-89%	2	<u>90-100%</u>	<u>0</u>	Total	8	N
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Total	8																		

A. Student Learning Outcome					
SLO #1: Demonstrate an understanding of General Cellular processes.					
B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)
H. Conclusions					
<p>We did not meet our performance standard.</p> <p>Since only declared AS in biology students were analyzed this is an extremely small sample size. We were able to assess only 7 students and even if we include last years' SLR we still only have a total of 21 students. The faculty believed this is still too small of sample sized to be statistically significant. Our plan is to continue to separate out the AS students and over the next few years to increase our total numbers to make our assessment measurement more robust.</p> <p>The strengths for this assessment measure is that we will be able to better assess just the AS majors in the future</p> <p>The weakness of this measure is the low number of students that we are currently able to assess. Faculty cannot currently make valid instructional changes with such a low number of students assessed.</p>					

A. Student Learning Outcome					
SLO #2: Apply understanding of the taxonomy, morphology, and physiology of the Animal and Plant Kingdoms.					
B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)
2a. Unit exams that assess the understanding of taxonomy, morphology, and physiology of plants.	2a. At least 70% of students in General Botany (BIOL 2104) declaring an AS in Biology will score 70% or better on all units exams.	2a. All students in General Botany will be given unit exams pertaining to this objective and each of these unit exams but only the AS students will be analyzed by	2a. Fall of 2016 had 3 and Spring of 2017 had 5 students assessed	2a. During the Fall of 2016, 66% of the AS students scored 70% or better on all 4 unit exams. During the Spring of 2017 60% of the AS students scored 70% or better on the 4 unit exams provided.	N
				During the Fall of 2016 Botany had only 4	

the faculty involved.

students out 42 students were AS Biology majors. The following Table summarizes the Fall 16 results

FALL 2016  
SCORE DISTRIBUTIONS

<u>Exam</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
100-90% =	0	0	0	0
89-80% =	2	0	1	0
79-70% =	1	2	1	2
69-60% =	0	1	1	1
0- 59% =	0	0	0	0

Percent of students making 70% or better  
on Unit Exams

Exam 1 = 100%

Exam 2 = 66%

Exam 3 = 66%

Exam 4 = 66%

During the Spring 2017 60% of AS students made 70% or better on all the unit exams. During the Spring of 2017, Botany had only 5 students out of 33 students were AS Biology majors. The following Table summarizes the Spring 17 results.

SPRING 2017  
SCORE DISTRIBUTION

<u>Exam</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
100-90% =	0	0	0	0
89-80% =	3	3	1	1
79-70% =	2	1	4	2
69-60% =	0	1	0	2
0 -59% =	0	0	0	0

Percent of students making 70% or better

				<u>on Unit Exams</u> Exam 1 = 100% Exam 2 = 80% Exam 3 = 100% Exam 4 = 60%																																											
2b Unit exams that assess the understanding of taxonomy, morphology, and physiology of animals.	2b. At least 70% of students declaring an AS in Biology in General Zoology (BIOL 2205) will score 70% or better on all unit exams.	2b. All students General Zoology (BIOL 2205) will be given unit exams pertaining to this objective and each of these unit exams will be analyzed by the faculty involved. Only the declared AS in Biology students will be reported.	2b.10 students assessed	2b. During the Fall 2016 and Spring 17 Zoology had only 10 students out 94 students were AS Biology majors. The following Table summarizes the Fall 16 and Spring 17 results.  <p style="text-align: center;">FALL 2016 and SPRING 17 SCORE DISTRIBUTIONS</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Exam</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> </tr> </thead> <tbody> <tr> <td>100-90% =</td> <td>0</td> <td>3</td> <td>1</td> <td>1</td> <td>3</td> <td>2</td> </tr> <tr> <td>89-80% =</td> <td>1</td> <td>1</td> <td>1</td> <td>4</td> <td>3</td> <td>2</td> </tr> <tr> <td>79-70% =</td> <td>6</td> <td>1</td> <td>2</td> <td>3</td> <td>3</td> <td>4</td> </tr> <tr> <td>69-60% =</td> <td>2</td> <td>3</td> <td>3</td> <td>0</td> <td>0</td> <td>2</td> </tr> <tr> <td>0- 59% =</td> <td>1</td> <td>2</td> <td>2</td> <td>2</td> <td>1</td> <td>0</td> </tr> </tbody> </table> <p><u>Percent of students making 70% or better on Unit Exams for Fall 16 and Spring 17</u>  Exam 1 = 70%  Exam 2 = 50%  Exam 3 = 50%  Exam 4 = 70%  Exam 5 = 90%  Exam 6 =80%</p> <p>During the Fall 2016 and Spring 17 70% of AS students made 70% or better on four of the six unit exams.</p> <p>Because of low numbers of AS Biology students we combined scores from</p>	Exam	1	2	3	4	5	6	100-90% =	0	3	1	1	3	2	89-80% =	1	1	1	4	3	2	79-70% =	6	1	2	3	3	4	69-60% =	2	3	3	0	0	2	0- 59% =	1	2	2	2	1	0	Y/N
Exam	1	2	3	4	5	6																																									
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0- 59% =	1	2	2	2	1	0																																									



				<p>previous semesters to obtain a more robust analysis. All of the Fall semesters from 2013-2016 are combined together and all of the Spring semesters from 2014-2017 are combined together to give an overall analysis of all 34 students that where declared AS Biology majors. We combined the Fall semester together and Spring semesters together to also analyze any differences between the two semesters.</p> <p>Percent of students making 70% or better on Unit Exams for Fall 13; Fall 14 , Fall 15 &amp; Fall 16</p> <p>Exam 1 = 70%</p> <p>Exam 2 = 70%</p> <p>Exam 3 = 85%</p> <p>Exam 4 = 89%</p> <p>Exam 5 = 85%</p> <p>Exam 6 = 96%</p> <p>Percent of students making 70% or better on Unit Exams for Spring 14, Spring 15 , Spring 16 &amp; Spring 17</p> <p>Exam 1 = 84%</p> <p>Exam 2 = 71%</p> <p>Exam 3 = 65%</p> <p>Exam 4 = 82%</p> <p>Exam 5 = 94%</p> <p>Exam 6 = 84%</p>	
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**H.  
Conclusions**

2a. For Fall 16 and Spring 17 we did not meet our performance stands on one out of four unit exams which was similar to that of previous academic year. We only assessed 8 students this academic year and the number is still not significantly large enough to make a serious adjustment based on the assessment result. We had only 3 students during 2015-2016 and increase in student number is promising.

2b. For Fall 16 and Spring 17, we did not meet our performance standards on two out of the six unit exams. Analyzing only one year with a total of only 10 students is such a small sample to be statistically valuable. So we have begun the process of combining several years of data (the last four SLRs to obtain a more statistically significant analysis. Although “teasing out” the AS students for the last four SLRs have yet to accumulate a significant number of students, if we combine the last four SLRs we are still analyzing only 34 students. With the combined semesters we are still meeting our standards except on one Unit exam 3 during the Spring semesters. Cumulatively for the 34 students that have been assessed over the last four SLRs 70% of the students have made 70% or better on all six unit exams except for Exam 3. Because this is still such a low number of students (34) it is believed that this is not a statistically significant number to warrant instructional changes at this time.

**A.  
Student Learning Outcome**

SLO #3: Demonstrate an understanding of the atom, compounds, matter, gases, solutions, atomic theory, bonding chemical reactions.

<b>B. Assessment Measure</b>	<b>C. Performance Standard</b>	<b>D. Sampling Method</b>	<b>E. Sample Size (n)</b>	<b>F. Results</b>	<b>G. Standard Met (Y/N)</b>
Comprehensive Pre-Post Exam.	70% of AS in Biology students will improve on the post-test by 20% or greater over the pre-test	Pre/Post Test given to all students in both Fall and Spring terms but only the AS biology students were analyzed.  Conducted as pre-post test.	Fall 16 8  Spring 17 0	This table summarizes the difference in student scores for the pre & post test scores for Fall 16.  Fall 16 Score Distribution (Post Test Improvement) <hr/> 0-10% 1 10-20% 2 <hr/> 20-30% 2 30-40% 3 40-50% 2 50-60% 0 60-70% 0 70-80% 0 80-90% 0 90-100% 0 <b>Average gain:</b> 26.8	Y

**H.  
Conclusions**

Student scores on the post-test improved by an average of 75% for the Fall 16. Our goal of as least a 20% increase was met.

The Spring 17 semester could not be analyzed because of no declared AS in biology majors.

**A.  
Student Learning Outcome**

SLO #4: Demonstrate knowledge about the components and requirements of a safe lab environment.

<b>B. Assessment Measure</b>	<b>C. Performance Standard</b>	<b>D. Sampling Method</b>	<b>E. Sample Size (n)</b>	<b>F. Results</b>	<b>G. Standard Met (Y/N)</b>
A laboratory exercise and worksheet will be administered to all students in Biol. 1144.	100% of the students in Biol. 1144L will complete and pass the worksheet over laboratory safety. This exercise requires students to learn biology laboratory protocols and safety equipment and its proper use and function. This will be a pass/fail exercise. Any student not passing the exercise will be required to repeat the exercise until they can pass.	All students in majors biology course (Bio. 1144L) were sampled during the Fall 2016 and Spring 2017	425	Out of the 425 students all completed the exercise with a passing grade.	Y

**H.  
Conclusions**

Although our goal was achieved and students are learning proper laboratory safety, the coordination and implementation of this process has continued

to be challenging because of the number of adjuncts teaching the labs, but with increased communication and coordination by our Department Head it has become a more seamless process.

## 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 changes are planned at this time. We have changed our Biol. 1144 lab manual for the Fall 17.	This will aid in our SLO's #s 1, 3 and 4	The new lab manual has more critical thinking, rigor and more closely aligns with our current outcomes.

## PART 6

### Summary of Assessment Measures

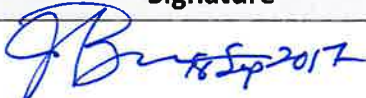


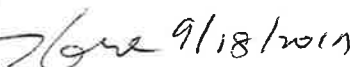




- A. How many different assessment measures were used? 3
- B. List the direct measures (see appendix):

Pre/Post tests in Cellular Biology (BIOL1144)  
 Unit exam scores in General Botany (BIOL2014)  
 Unit exam scores in General Zoology (BIOL2205)

C. List the indirect measures (see appendix): 0

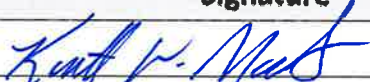
**PART 7**  
**Faculty Participation and Signatures**

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	Reviewed report	 18 Sep 2017
Mrs. Claudia Glass	Collected data for BIOL 1144, and BIOL 2104, analyzed data, prepared report, and reviewed report	 9-18-17
Mr. Don Glass	Collected data for BIOL 1144 and BIOL 2205 analyzed data, prepared report, and reviewed report	 9-18-17
Dr. Jaeho Kim	Prepared report, and reviewed report	 9/18/2017
Dr. Sue Katz	Reviewed report	 9/18/17
Dr. Craig Zimmerman	Collected data for BIOL 1144, analyzed data	 9/18/2017
Dr. Jin Seo	Reviewed report	 9/18/2017
Dr. Lisa Overall	Reviewed report	 09-18-17

B. Reviewed by:

Titles	Name	Signature	Date
Department Head	Dr. Jerry Bowen		18 Sep 2017

<b>Titles</b>	<b>Name</b>	<b>Signature</b>	<b>Date</b>
Dean	Dr. Keith Martin		9/18/17

## 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?