Degree Program Student Learning Report

Revised November 2019

Select Academic Department

AS in Biological Sciences

For 2023-2024 Academic Year

PART 1
Degree Program Mission and Student Learning Outcomes

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

University Mission	College 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 College 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 College, and the department, the degree seeks to develop a student with a broad and diverse background in science and general education.

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

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

University Commitments	College Purposes	Department Purposes	Student Learning Outcomes
experiences which foster student excellence in oral and written communications, scientific reasoning and critical and creative thinking.	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	2. Apply understanding of the taxonomy, morphology, and physiology of the Animal and Plant Kingdoms. 3. Demonstrate an understanding of the atom, compounds, matter, gases, solutions, atomic theory, bonding chemical reactions, and chemical kinetics.
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.		Demonstrate knowledge about the components and requirements of a safe lab environment To promote a positive learning environment in our classrooms and on campus.	4. Demonstrate knowledge about the components and requirements of a safe lab environment.
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 College 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 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. To increase the student's ability to interpret and understand his/her world.	
To provide students with a diverse, innovative faculty dedicated to excellence in teaching, scholarly pursuits and continuous improvement of programs.	The College fosters a community of scholars among the faculty and students of the institution		

University Commitments	College 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 College 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
No instructional changes were proposed for SLR 2022-2023	N/A	

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 AS Biology Student Learning Report for 2022-2023 was not peer reviewed.	NA	

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: 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)
Comprehensive Post Exam. This is the same exam given for pre/post-exam evaluations for SLO # 3 but only the scores	70% of students declaring an AS in Biology major will score 70% or above on the post-exam	Pre/Post Exam given to all students during 2022-2023 academic year. However, only the AS biology students were analyzed.	Sample size by semester: Fall 22: 6 Spring 23: 1	During 2023-2024 school year, we had 20 students we could include in our assessment. The average post-exam score was 61.5. To investigate if there were statistical outliers, we calculated if any of the scores were more than 2 standard deviations away from the mean. All of our	N

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)**
on the post-exam are being measured. This pre/post-exam covers scientific method and evolution, basic chemistry, biological macromolecules, cellular energetics, cellular genetics, and cell reproduction.				available data was within 2 SD – therefor include within our analysis. Below are our results from this assessment cycle. **2023-2024 Post test Score Distribution** 0-49% 6 50-59% 1 60-69% 5 70-79% 3 80-89% 3 90-100% 2		
H. **Conclusions**						
We have not met our performance standards this academic year. To investigate if there were statistical outliers, we calculated if any of the scores were more than 1.5 standard deviations away from the mean. All of our available data was within this threshold – therefor include within our analysis. While no data is removed for our analysis, students who score low on our post exams warrant further expoloration as to what causes, challenges, or changes can be made to increase all student success. Our post-exam scores are near a bimodal disturbution – indicating that some students are doing well in our instruction, while others are likely struggling. We plan to continue to separate out the AS students and over the next few more years to increase our total numbers and cumulatively add up the results to make our assessment measurement more robust before suggesting any instructional						

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)
changes. The strength of this assessment measure is that we will be able to better assess just the AS majors in the future across multiple years, despite delivery formats (due to lingering effects of covid) or other challenges to both faculty and students.					

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. The average of four unit exams covering the anatomy and physiology of plants.	2a. At least 70% of students in General Botany (BIOL 2104) declaring an AS in Biology will score an average of 70% or better on the four unit exams.	2a. All students in General Botany will be given unit exams. Each AS students average score will be computed across the four exams.	2a. Sample size by semester: Fall: 0 Spring: 3	Only three AS students were sampled across, all within Spring 2024. One student scored above our standard (72.3%). Two students did not meet our performance standard (64% and 63%).	N
2b A pre-post exam which covers the understanding of taxonomy, evolution, morphology, and physiology of specific animal phyla animals.	2b. At least 70% of students in General Zoology (BIOL 2205) declaring an AS in Biology will score 70% or better on the post instruction exam.	2b. All students General Zoology (BIOL 2205) will be given a comprehensive pre-post exam. However, only AS students will be analyzed by the	2b. Sample size by semester: Fall: 2 Spring: 2	2b. During the Fall 2023 and Spring 2024, General Zoology had four AS Biology students. All students assessed scored above our performance standard (range 71-78%, $\bar{x}$ =75.	Y

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)
		faculity instructor for this report.			

H.
Conclusions

| 2a. For Fall 23 and Spring 24 we did not meet our performance stands for one of the courses. With only three students assessed, inferences may be difficult to support. We fully expect to continue with this assessment method and combine multiple years for future analysis.

2b. We met our performance standard during this academic year. We will continue to collect data with the new assessment measure. By doing so, we with to be able to make long term comparisions and discover yearly trends across this course. This is only the second year of this assessment method within the course. |
|---|

A.
Student Learning Outcome

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

B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)
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 Exam given to all students enrolled in BIOL 1144 during fall 2023 or spring 2024. However, only the AS	Sample size by semester:

Fall 23: 11
Spring 24: 2 | This table summarizes the difference in student scores for the pre & post exam scores for Fall 22 and Spring 23.

Fall 2023 and Spring 2024 Score Distribution (Post-Exam Improvement) | Y |

A. Student Learning Outcome

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

B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results		G. Standard Met (Y/N)
		biology students were analyzed Conducted as Pre/Post Exam.		0-9% 10-19% 20-29% 30-39% 40-49% 50-59% **Average gain:**	2 1 3 3 3 1 23.5	

H. Conclusions

Students improved on the post-test by an average of 23.5%. Our goal of as least a 20% increase average of all assessed students was met. This met our performance goals, but the improvement was less than last year. However, this years average gain is similar to multiple previous years. Three students during 2023-2024 did not meet our improvement goal. These summary statistics omit any students that withdrew or were unable to take both the pre or post examination.

A. Student Learning Outcome					

**A.
Student Learning Outcome**

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

B. Assessment Measure	C. Performance Standard	D. Sampling Method	E. Sample Size (n)	F. Results	G. Standard Met (Y/N)
A laboratory exercise and worksheet will be administered to all students in Biol. 1144.	100% of the AS students in BIOL 1144L will complete and 100% will pass the quiz 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 (BIOL 1144L) were sampled during the Fall 2023 and Spring 2024 Tests were administered in an online format.	36	Of the 36 students sampled, 100% of the students completed and passed the laboratory safety quiz.	Y

**H.
Conclusions**

Our set goal was achieved and students are learning proper laboratory safety across the multiple lab sections. The lab test was administered online which allowed instructors to monitor students' qualification to attend the rest of the labs on a real-time basis. During summer 2024 – biology assessment committee will determine if a new assessment method should be used monitor student progress.

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

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)
   Lab Safety Test in Cellular Biology (BIOL1144L)
   Average unit exam scores in General Botany (BIOL2014)
   Post 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	Collected data, Reviewed report	
Dr. Jaeho Kim	Collected data, Reviewed report	
Dr. Cheyanne Olson	Reviewed report	
Dr. Mark Peaden	Collected data, prepared, reviewed report	*Mark Peaden*
Dr. Jin Seo	Reviewed report	*Jin Seo*
Dr. Hannah King	Reviewed report	
Dr. Craig Zimmermann	Collected data, Reviewed report	

B. Reviewed by:

Titles	Name	Signature	Date
Department Head	Dr. Jin Seo	*Jin Seo*	5/31/24
Dean	Dr. Susan Willis	*Susan Willis*	5-31-24

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	Indirect Measures
• Comprehensive exams	• Graduate exit interviews
• Class assignments	• Focus group responses
• Juried review of performances and exhibitions	• Job placement statistics
• Internship or clinical evaluations	• Graduate school placement statistics
• Portfolio evaluation	• Graduation and retention rates
• Pre/post exams	• Student and alumni surveys that assess perceptions of the program
• Third-party exams such as field tests, certification exams, or licensure exams	• Employer surveys that assess perceptions of graduates
• Senior thesis or capstone projects	• 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?