

Degree Program Student Learning Report (rev. 7/14)

Fall 2014 – Spring 2015

The Department of Biology in the School of Mathematics, Science & Health Sciences

Biology, B.S.

Effectively assessing a degree program should address a number of factors:

- 1) Valid student learning outcomes should be clearly articulated;
- 2) Valid assessment measures should be used, consistent with the standards of professional practice;
- 3) There should be evidence that assessment data are being used by faculty to make necessary instructional or assessment changes; and there should be evidence that instructional or assessment changes are being implemented to improve student learning.

PART 1 (A & B)

Relationship of Degree Program Learning Outcomes to Departmental and University Missions

A. Clearly 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. Three departments comprise this School, the Departments of	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

University Mission	School Mission	Department Mission	Degree Program Mission
	Biology, Health Science, and Math and Physical Science. These departments pledge to deliver existing and newly developed programs that meet student demands, and to be responsive to the evolving culture of academia in general and the sciences in particular.		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. Clearly state school purposes, department purposes and degree program student learning outcomes. Align student learning outcomes with their appropriate school and department purposes, and these outcomes and purposes 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 Curriculum utilizes academically rigorous methodologies delivered by a quality faculty who possess a broad base of content knowledge and promote the acquisition, application and discussion of current subject matter. The School uses <i>effective instructional techniques, empirical and evidenced-based inquiry, innovative technology, and a variety of learning environments for the purpose of enhancing student learning.</i>	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.	The School promotes a challenging, positive, and inquisitive Collegial environment of high ethical standards and of frequent interactions between faculty and students to foster independent thought and the collegial exchange of ideas.	To apply good laboratory practice to minimize/eliminate potential laboratory hazards.	3. Demonstrate knowledge of safety protocols
To provide a general liberal arts education	The School recognizes the importance of	To increase student understanding and	4. To be adequately prepared for transition

University Commitments	School Purposes	Department Purposes	Student Learning Outcomes
that supports specialized academic program sand prepares students for lifelong learning and service in a diverse society.	scientific literacy in general education and its contribution to the liberal studies curriculum of the university.	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.	into a productive professional career. 1. 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.			
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.	Our commitment to Service enhances the public welfare and economic development potential of our region by cultivating strategic partnerships with health and science-related industries, secondary and higher education institutions, and through active participation and leadership in civic and professional organizations by our faculty and students. These collaborative efforts are based on the belief that through shared relationships, service reinforces and strengthens learning, and learning reinforces and strengthens service. An emphasis of service encourages social awareness and responsibility among faculty and students.	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 scientific method and interpret current technology and research techniques relating to the biological sciences (This outcome meets two different departmental purposes).

PART 2

Discussion of Instructional Changes Resulting from 2013-2014 Degree Program Student Learning Report

List and discuss all instructional or assessment changes proposed in Part 5 of last year's Degree Program Student Learning Report, whether implemented or not. Any other changes or assessment activities from last year, but not mentioned in last year's report, should be discussed here as well. Emphasis should be placed on student learning and considerations such as course improvements, the assessment process, and the budget. If no changes were planned or implemented, simply state "No changes were planned or implemented."

Instructional or Assessment Changes	Changes Implemented (Y/N)	Impact of Changes on Degree Program Curriculum or Budget
To improve outcome 1, the development of a new Medical/Molecular course, Molecular Laboratory Techniques and modification of the Medical/Molecular degree plan.	Y	The degree option change we will propose will remove 1 (of 12) hours from the selected electives and the removal of one hour from BIOL 3504, Molecular Cell Biology. The Molecular Biology Techniques Laboratory Course will be a 2 hour course, and these changes will ensure that the degree plan retains the same number of required hours. This will impact the budget since the new course will require one more hour of lab These course and degree program changes have been approval by the State Regents and will be implemented Fall 2016
To improve implementation of outcome 3, we are in the process of hiring a laboratory coordinator and are planning on revising this exercise to include a written quiz over laboratory safety. This laboratory coordinator will develop this quiz and oversee that both the exercise and quiz are properly administered to all students and the results are given to the Head of the Biology Department.	Y	Hiring of a new laboratory coordinator will not impact the budget since this is already a line item in the budget.

PART 3

Discussion About the University Assessment Committee's 2013-2014 Peer Review Report

The University Assessment Committee in its Degree Program Peer Review Report provided feedback and recommendations for improvement in assessment. List or accurately summarize all feedback and recommendations from the committee, and state whether they were implemented or will be implemented at a future date. If they were not or will not be implemented, please explain why. If no changes were recommended last year, simply state "No changes were recommended."

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PART 4

Analysis of Evidence of Student Learning Outcomes

For all student learning outcomes (as listed in Part 1 B above), describe the assessment measures and performance standards used, as well as the sampling methods and sample sizes. For each measure, document the results of the activity measured and draw relevant conclusions related to strengths and weaknesses of their performance.

A. Student Learning Outcomes	B. Assessment Measures	C. Performance Standards	D. Sampling Methods	E. Sample Size (N)	F. Results	G. Conclusions	H. Performance Standards Met (Y/N)
1. To demonstrate an understanding of the fundamental processes of life.	1a. Survey in BIOL 4801, Biology Research Methods II, Covering understanding of program objective 1.	1a. On the survey, students will rank themselves 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 2014 & Spring 2015	1a. 31	1a. Questions were based on a Likert scale from 1 to 5, with 1 being very poor and 5 being excellent. Result average was 4.4. Of the 31 students surveyed, 12 ranked themselves as 5 (excellent) and 18 ranked themselves as 4 (Good), and 1 ranked themselves as a 3 (average) on mastery of program objective 2. This result is comparable to last year's result, which had the same sample 8 ranked themselves as 5, 20 ranked themselves as 4, and 1 ranked themselves as a 3.	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.	1a. Y

A. Student Learning Outcomes	B. Assessment Measures	C. Performance Standards	D. Sampling Methods	E. Sample Size (N)	F. Results	G. Conclusions	H. Performance Standards Met (Y/N)
	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 students in BIOL 4801.	1b. 32	1b. Our students had a mean score of 150 for the ETS compared with the national average 153. Student scores ranging from 129-177 with 32 of 32 students with scores of 140 or greater (within one standard deviation of the national mean).	1b. Our average student score was within one standard deviation of the national mean. Since 2012-2013, our average student score has been within one standard deviation of the national mean. Given the diversity of our student population, we believe this is a significant accomplishment. No new instructional changes are anticipated.	1b. Y
	1c. Education Testing Service Major Field Assessment Exam for Biology in BIOL 4801, Biology Research Methods II.	1c. ETS exam reports four sub-scores in; a) Cell Biology, b) Molecular Biology & Genetics, c) Organismal Biology, and d) Population Biology, Evolution, & Ecology. Our measure is that three of the four sub-scores for the exam will be within 5 percent of their normative means. The	1c. All students in students in BIOL 4801.	1c. 32	1c. Across both degree programs, students averaged 150 while the national average was 153. The distribution of student scores within one standard deviation of the mean for each subset is listed in Appendix A. Subset #1 – Cell Biology: 26/32 students were within one standard deviation of the National Mean. For subset #2 – Molecular Biology and Genetics: 29/32 students were within one standard deviation of the National Mean. For subset #3 – Organismal Biology: 26/32 students were within one standard deviation of	1c. Changing our assessment criterion from 5% of the national mean to one standard deviation on the national mean is a more statistically meaningful evaluation of student performance. In regards to cumulative ETS scores across all subsets, our students performed well compare to the national mean. On average, 28 of 32 were above one standard deviation of the national mean. Cumulative student totals from 2012-2014 are also reported in Appendix A. No new instructional changes are anticipated.	1c. Y

A. Student Learning Outcomes	B. Assessment Measures	C. Performance Standards	D. Sampling Methods	E. Sample Size (N)	F. Results	G. Conclusions	H. Performance Standards Met (Y/N)
		fourth sub-score will be within 10 percent of the mean.			the National Mean. For subset #4 – Population Biology, Evolution, and Ecology: 30/32 students were within one standard deviation of the National Mean		
2. To apply scientific method and interpret current technology and research techniques relating to the biological sciences.	2a. Survey in BIOL 4801, Biology Research Methods II, covering understanding of program objective 2.	2a. 70% of students will indicate 80% understanding of program objective 2.	2a. All students in the BIOL 4801 classes in Fall 2014 & Spring 2015	2a.30	2a. Questions were based on a Likert scale from 1 to 5 with 1 being very poor and 5 being excellent. Of the 30 students surveyed 14 ranked themselves as 5 (excellent) and 14 ranked themselves as 4 (Good), and 2 ranked themselves as a 3 (average) on mastery of program objective 2. Overall average for all students surveyed was 4.4.	2a. 94% 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.	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 2012 and Spring 2013.	2b. 40	2b. 100 % of students completing Research Methods II in Fall and Spring 2013-2014 earned a grade of B or higher on the written paper	2b. The mentoring process between faculty mentor and mentee is providing sufficient feedback to students as they prepare the final version of their papers. No new instructional changes are anticipated.	2b. Y

A. Student Learning Outcomes	B. Assessment Measures	C. Performance Standards	D. Sampling Methods	E. Sample Size (N)	F. Results	G. Conclusions	H. Performance Standards Met (Y/N)
	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 (Biology to replace 'science') Faculty.	2c. All students in BIOL 4801 Fall 2012 and Spring 2013.	2c. 40	2c. 100 % of students completing Research Methods II in Fall and Spring 2012/2013 earned a grade of B or higher on the research 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.	2c. Y
3. Demonstrate knowledge of safety protocols.	3. A laboratory exercise and worksheet will be administered to all students in Biol. 1144	3. 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	3. All students in majors biology course (Bio. 1144L) will be sampled in Fall 2013/Spring 2014	3. 418	3. Out of the 418 students only 20 were required to repeat the exercise, upon which they received a passing grade.	3 Although our goal was achieved and students are learning proper laboratory safety, the coordination and implementation of this process has proved challenging because of the number of adjuncts teaching the labs. To improve implementation, we have hired an adjunct lab coordinator (started August 1, 2015) and she is in the process of revising the safety exercise and is constructing a written quiz over laboratory safety.	3. Y

A. Student Learning Outcomes	B. Assessment Measures	C. Performance Standards	D. Sampling Methods	E. Sample Size (N)	F. Results	G. Conclusions	H. Performance Standards Met (Y/N)
		they can pass.					
4. To be adequately prepared for transition into a productive professional career.	4a. The Biology Faculty will administer a post-graduate survey of convenience consisting of 21 questions, by e-mail or phone asking about their transition from RSU into post-graduate endeavors (job, internship, graduate school, professional school).	4a. 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).	4a. 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).	4a. 16	4a. Of the 33 surveys sent, we had 16 responses (7 from 2012 graduates and 9 from 2010 graduates). Fourteen out of sixteen responses were 4 or better on the Likert scale, a result of 88% in regards to preparedness for post-graduate careers and/or graduate school. Fourteen of sixteen students responded with 4 or better in regards to skills and knowledge being better than graduates from other biology programs. Fifteen of sixteen students responded with 4 or better in regards to recommending RSU to a friend. These results exceed our 70% criterion.	4a. 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. 4b. This data suggest that 90% 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.	4a. Y
	4b. The Biology Faculty will administer a survey to collect students' activities post-graduation.	4b. 80% of reporting students are working or continuing education in biology. 50% are in graduate or	4b. Biology faculty will administer a survey to collect information about student's activities post-graduation.	4b. 182	4b. Since May 2003 we have had 316 students graduate with BS in Biology. Of these 316 students, we have been able to track 212 graduates. These 212 graduates have been placed in the following; 3 Physical Therapy		4b. Y

A. Student Learning Outcomes	B. Assessment Measures	C. Performance Standards	D. Sampling Methods	E. Sample Size (N)	F. Results	G. Conclusions	H. Performance Standards Met (Y/N)
		professional school.			3 Dentistry 4 Emergency Medical Technician 2 Occupational Therapist 6 R.N. 1 Surgical Technician 1 Optometry 10 Physician Assistant 3 Veterinarian 4 Dentistry 36 Medical School (D.O. and M.D.) 5 Medical Technologists 15 Water Quality/Environmental Quality/Safety 8 Game Wardens/F&W S/Army Core of Engineers 5 Pharmacists (Pharm. D.) 5 Naturalists and Guides 24 Graduate School Programs 14 Education (including K-16) 59 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 RSU students enrolled or graduated from professional schools.		

PART 5

Proposed Instructional Changes Based on Conclusions Drawn from Evidence Presented Above

State any proposed instructional or assessment changes to be implemented for the next academic year. They should be based on conclusions reported in Part 4 (above) or on informal activities, such as faculty meetings and discussions, conferences, pilot projects, textbook adoption, new course proposals, curriculum modifications, etc. Explain the rationale for these changes and how they will impact student learning and other considerations, such as curriculum, degree plan, assessment process, or budget. If no changes are planned, simply state "No changes are planned."

Student Learning Outcomes	Instructional or Assessment Changes	Rationale for Changes	Impact of Planned Changes on Student Learning and Other Considerations.
1. To demonstrate an understanding of the fundamental processes of life.	1a. Development of a new Medical/Molecular course, Molecular Laboratory Techniques and modification of the Medical/Molecular degree plan.	1a. This is designed to improve our student learning outcomes, as demonstrated by the ETS sub-scores. We have determined that there is a need for a molecular biology techniques course. The discussion led to a decision to develop the course and accompanying Medical/Molecular degree plan modifications. In this current year, 2014-2015, we have continued this discussion and will complete the proposal. With approval of the Regents, we expect to add the course and degree plan changes during the 2015-2016 year.	1a. The degree option change we will propose will remove 1 (of 12) hours from the selected electives and the removal of one hour from BIOL 3504, Molecular Cell Biology. The Molecular Biology Techniques Laboratory Course will be a 2 hour course, and these changes will ensure that the degree plan retains the same number of required hours. This will impact the budget since the new course will require one more hour of lab. These course and degree program changes have been approval by the State Regents and will be implemented Fall 2016
	1b. New equipment: q-PCR, microscopes	1b.	1b
	1c. Implementation of common one day presentation for Biol 4602/4801 Research Methods I/II presentations	1c.	1c.
3. Demonstrate knowledge of safety protocols.	3. To improve implementation, we are in the process of hiring a laboratory coordinator and are planning on revising this exercise to include a written quiz over laboratory safety. This laboratory coordinator will develop this quiz and oversee that both the exercise and quiz	3. The coordination and implementation of this assessment has proved challenging because of the number of adjuncts teaching the labs.	3. The department hired apart-time lab coordinator on Aug 1, 2015. Success of hire will be assessed in 2015-2016 SLR.

Student Learning Outcomes	Instructional or Assessment Changes	Rationale for Changes	Impact of Planned Changes on Student Learning and Other Considerations.
	are properly administered to all students and the results are given to the Head of the Biology Department.		

PART 6

Shared Pedagogical Insight that Improves Student Learning or Classroom Engagement

(OPTIONAL) If your department or a faculty member has developed a method or technique of teaching that seems especially effective in improving student learning or student engagement in the classroom, please provide a brief description below. More detail can be communicated during the face to face peer review session.

Description
None

PART 7 (A & B)

Assessment Measures and Faculty Participation

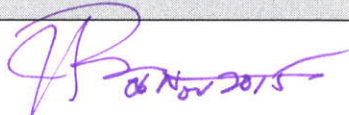



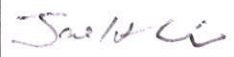



A. Assessment Measures:

- 1) How many different assessment measures were used? 6
- 2) List the direct measures (see rubric): Written and Oral Presentations in Research Methods II; ETS Results; Written Laboratory exercise on laboratory safety
- 3) List the indirect measures (see rubric): Senior Survey (Mastery of Program Survey) and Post-Graduate Survey

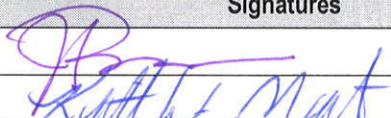

B.

- 1) Provide the names and signatures of all faculty members who contributed to this report and indicate their respective roles:

Faculty Members	Roles in the Assessment Process (e.g., collect data, analyze data, prepare report, review report, etc.)	Signatures

	(e.g., collect data, analyze data, prepare report, review report, etc.)	
Dr. Jerry Bowen	Collected data, analyzed data, prepared report, & Reviewed report	
Mrs. Claudia Glass	Reviewed report	
Mr. Don Glass	Collected data, Analyzed data, Prepared report, & reviewed report	
Dr. Sue Katz	Collected data, Analyzed data, Prepared report, & reviewed report	
Dr. Jae-Ho Kim	Reviewed report	
Dr. Eric Lee	Collected data, Analyzed data, Prepared report, & reviewed report	
Dr. Adele Register	Reviewed report	
Dr. Craig Zimmerman	Reviewed report	
Dr. Jin Soe	Reviewed report	

2) Reviewed by:

Titles	Names	Signatures	Date
Department Head	Dr. Jerry Bowen		06 Nov 2015
Dean	Dr. Keith Martin		11/30/2015