Academic Assessment Report - AY 2012-2013

College, School/Department, Name of Program: College of Natural and Applied Health Science, School of Environmental and Life Science, BS Biology and BS Earth Science

Program SLOs:

SLO #1: Demonstrate an understanding of the basic mechanisms and processes associated with biological, atmospheric, geologic, hydrologic, and geographic systems as unifying principles of contemporary environmental and life science, and the ability to apply these to a research environment that includes basic principles, theories, methods, and protocols for scientific discovery and problem-solving. (KU 1, KU 4) (GE K1, K3; S1, S2, S3, S4, S5, V1)

SLO #2: Identify the interconnections among scientific disciplines and the multiple dynamic biotic and abiotic system processes associated with the various components of the environment. Identify how these can change under varying environmental conditions (both natural and anthropogenic); and apply these relationships to scientific investigation. (KU 1, 2, 3, 4) (GE K1, K3; S1, S2, S3, S4, S5, V1).

SLO #3: Design and conduct efficient and targeted scientific studies of contemporary problems in the life and environmental sciences. Analyze data using current, appropriate and efficient laboratory, field, appropriate software, and statistical methods in order to identify and visualize the discoveries and knowledge resulting from research projects that provide an understanding of causes, solutions, prediction of outcomes, etc. associated with these contemporary problems. (KU 1, KU 2, KU 3, KU 4) (GE K1, K2, K3, K4; S1, S2, S3, S4, S5, V1, V5)

SLO #4: Communicate scientific research findings and other information efficiently and convincingly to professional and community audiences using oral and written methods. (KU 1, KU4) (GE K1, K3, K4, S1, S2, S3, S4, S5, V1).

SLO#5: Demonstrate a global perspective of the environmental and life sciences and how they are connected to a global society. (KU 1, KU 2, KU 3, KU 4) (GE K1, K2, K3; S1, S2, S3, S4, S5, V1, V2, V4)

Program Level Student Learning Outcomes *(Add rows for additional SLOs)*	Assessment Measure(s) *(Add rows if necessary)*	Assessment Criteria *(Describe how data is collected--rubric, survey, etc.)*	Results of Assessment *(Specific to Data Collected)*	Action Taken *(Closing the Loop: New action or follow up from last Assessment Report)*
SLO #1 **Demonstrate an understanding of the basic mechanisms and processes associated with biological, atmospheric, geologic, hydrologic, and geographic systems as unifying principles of contemporary**	Direct #1: Use data from written and oral research assignments to assess student's ability to critically read, think, analyze, and present about the sciences	Data will be collected using the GE oral and written rubrics and to written assignments and oral presentations for: • SELS 1000 • BIOS 1200, 2201, 2202, 3201 • ES 2101	For SELS 1000 and the BIOS courses, the mean Basic Content scores were from 8 (in 2202) to 10 (in 3201), with an overall mean of 9.2 of 10. The mean Application-related scores were from 7 (2201) to 9 (3201 and 1000), with an overall mean of 8.3. For ES 2101 and METR 3380, the mean Basic Content	It is very early yet in our program delivery period, but it appears that the SELS students are demonstrating a solid ability to pick up and apply scientific content that they read and write about. We will continue to assess our entry level and intermediate level students; and as we develop and deliver our own unique capstone, will in AY 2013/14 or AY 14/15 we will also assess these students using

environmental and life science, and the ability to apply these to a research environment that includes basic principles, theories, methods, and protocols for scientific discovery and problem-solving.		• METR 3380	scores were 9.3 and 8.4, respectively, with an overall mean of 8.9 of 10. The mean Application-related scores were 8.9 and 9.3, respectively, with an overall mean of 9.1.	this rubric.
	Direct Measure #2: Assess evidence for students demonstrating content knowledge	a) In BIOS 1200, 2201, and 2202 we will use the textbook LearnSmart Assessment Modules and On-Line Chapter Quizzes. Assess b) For Biology Seniors, we will use the ETS National Subject Exam to assess their content knowledge in BIO 4970 (Senior Seminar). c) For Earth Science Majors, we used the Content and Contextual-focused components of the GE rubric used in the ES 4963 (the Senior Seminar)	a) For BIOS 1200 the mean LearnSmart scores for all chapters covered was 61%; for BIOS 2201 was 88%; and for BIOS 2202 was 81%. For BIOS 1200, the mean textbook quiz scores was 53%; for BIOS 2201 was 84%; and for 2202 was 78%. b) The ETS assessment was administered in Spring 2013. Forty-four students participated in the survey, which yielded a mean score of 134 points. The National ETS mean score for test is 153 points. c) The mean scores for these components for the Seniors was 9.1.	a) It is fairly clear that there is a "weeding out" process that is occurring as students move from BIOS 1200 to 2201/2202. This is not only based on the extreme difference in textbook-based assessments, but also on the decrease in the number of students from 3 or 4 sections of 1200 to 1 or 2 sections of 2201 or 2202. We will continue to use these assessments as they appear to be good indicators of the student's ability to pick up content knowledge, and move on as Biology majors. b) There are two main issues in understanding these data. First, this class has a mixture of BS and BA majors. In the future, we will have our own sections for BS majors. Second, as of the time of this report, we have not yet received a breakdown of the data into sections: Organismal Biology, Cell Biology, Population, Biology, Evolution, Ecology, and Molecular Biology & Genetics. Thus, we cannot tell where the students' strengths or weaknesses are. Once we receive this information we will be able to enhance the activities and learning strategies in the specific areas. c) The Earth Science Seniors are clearly demonstrating a good grasp of the basic concepts. As there is no ETS standardized test for the Earth

				Sciences, we are in the process of developing one we can use for these students in the future, and hope to implement it in AY 2013/14 (spring) as a summative assessment.
	Indirect: Graduating Student Survey	We will focus on the responses of students to the following questions, with mean scores of 1.5 (I being the best score, 5 being the lowest): • the ability to demonstrate basic knowledge as unifying principles; • the ability to identify interconnections among disciplines; • the ability to design and conduct research; • the ability to apply the latest computation and lab methods; • the ability to	At the time of writing this report we had not received any scores yet.	Although surveys were sent out, we did not receive any responses. We will work with the Office of Assessment to try to ensure we receive responses in the future.

			communicate scientific results; • and demonstrate a global perspective of science		

SLO #2 **Identify the interconnections among scientific disciplines and the multiple dynamic biotic and abiotic system processes associated with the various components of the environment. Identify how these can change under varying environmental conditions (both natural and anthropogenic); and apply these relationships to scientific investigation.**	Direct #1: Use data from written and oral research assignments to assess student's ability to critically read, think, analyze, and present about the sciences	Data will be collected from the same classes mentioned above for SLO #1 Direct Measure #1, using the GE oral and written rubrics, focusing on assessing the students' ability to see understand the interdisciplinarity of the sciences.	For SELS 1000 and the BIOS courses, the mean Context Relations scores for all classes were between 9 and 10(mean of 9.4). The mean Critical Thinking scores were from 7.7 (1200) to 9.4 (1000), with an overall mean of 8.4. For ES 2101 and METR 3380, the mean Context Relations scores were 8.6 and 9.4, respectively, with an overall mean of 9 of 10. The mean Critical Thinking scores 8 and 9.8, respectively, with an overall mean of 8.9.	We are encouraged by these scores in that they suggest our students are fairly successful at identifying the interdisciplinarity of the sciences, which, to us, requires the kind of higher order thinking associated with the Critical Thinking components of our classes. We will continue with these assessments in order to get a better longitudinal assessment of student learning
	Indirect: Graduating Student Survey	We will focus on the responses of students to the following questions, with mean scores of 1.5 (I being the best score, 5 being the lowest): • the ability to demonstrate basic knowledge as unifying principles; • the ability to identify interconnections among disciplines; • the ability to design and conduct research; • the ability to apply	At the time of writing this report we had not received any scores yet.	Although surveys were sent out, we did not receive any responses. We will work with the Office of Assessment to try to ensure we receive responses in the future.

		the latest computation and lab methods; • the ability to communicate scientific results; • and demonstrate a global perspective of science		
SLO #3 **Design and conduct efficient and targeted scientific studies of contemporary problems in the life and environmental sciences. Analyze data using current, appropriate and efficient laboratory, field, appropriate software, and statistical methods in order to identify and visualize the discoveries and knowledge resulting from research projects that provide an understanding of causes, solutions, prediction of outcomes, etc. associated with these contemporary problems.**	Direct #1: Use data from written and oral research assignments to assess student's ability to critically read, think, analyze, and present about the sciences	Data will be collected from the same classes mentioned above for SLO #1 Direct Measure #1, using the GE oral and written rubrics, focusing on assessing the students' ability to see apply their knowledge in scientific studies.	For SELS 1000 and the BIOS courses, the mean Methods scores for all classes were between 6.5 (2201) and (1000 and 3201), with an overall mean of 7.7. The mean Application scores were between 8 (2202) and 9.3 (3201), with an overall mean of 8.4. For ES 2101 and METR 3380, the mean Methods scores were 9.2 and 8.4, respectively, with an overall mean of 8.8. The mean Application scores were 8.9 and 9.7, respectively, with an overall mean of 9.3.	In Biology, we feel we need to work more on helping the students strengthen their ability in experimental design and understanding methods used in projects. Once they have the data, they appear to be fine at interpretation. Thus, we will be implementing more project and discovery-based learning in these BIOS courses, including spending more time on the theories behind the use of the different methods. It appears that this is not an issue at this point in the Earth Sciences. We will continue these assessments in the future for both programs.

			At the time of writing this report we had not received any scores yet.	Although surveys were sent out, we did not receive any responses. We will work with the Office of Assessment to try to ensure we receive responses in the future.
	SLO #3 Indirect Measure #1. We will use the Graduating Student Survey.	We will focus on the responses of students to the following questions, with mean scores of 1.5 (I being the best score, 5 being the lowest), that are the most relevant to being able to show success in this SLO: • the ability to design and conduct research; • the ability to apply the latest computation and lab methods; • the ability to communicate scientific results.		
SLO #4 Communicate scientific research findings and other information efficiently and convincingly to professional and community audiences using oral and written methods.	Direct #1: Use data from written and oral research assignments to assess student's ability to critically read, think, analyze, and present about the sciences	Data will be collected from the same classes mentioned above and in ES 4963 for SLO #1 Direct Measure #1, using the GE oral and written rubrics to assess their abilities to clearly communicate scientific information	For SELS 1000 and the BIOS courses, the mean total score for their presentations was 8.6 out of 10 for all categories. For ES 2101 and METR 3380, the mean total score for their presentations was 9.1 out of 10 for all categories.	We feel strongly that once the students grasp the concepts they are very good at presenting their work in a coherent manner. We believe that, again, perhaps the weakest area is in understanding the Methods components (theory and when to use different Methods), as the range here was 6.5 to 9.2 (mean of 8.3). Thus, we will continue to enhance the sections of our labs that focus on the Methods

				used to address scientific issues.
	Indirect Measure #1. We will use the Graduating Student Survey.	We will focus on the responses of students to the following questions, with mean scores of 1.5 (I being the best score, 5 being the lowest), that are the most relevant to being able to show success in this SLO: • the ability to design and conduct research; • the ability to communicate scientific results.	At the time of writing this report we had not received any scores yet.	Although surveys were sent out, we did not receive any responses. We will work with the Office of Assessment to try to ensure we receive responses in the future.
SLO #5 **Demonstrate a global perspective of the environmental and life sciences and how they are connected to a global society.**	Direct #1: Use data from written and oral research assignments to assess student's ability to critically read, think, analyze, and present about the sciences	We will add to this rubric specific components to assess for students abilities to • identify, address and communicate environmental and life science issues that are of a global	We have not successfully done this yet.	We are working on developing teaching and learning strategies that will help the students gain this important level of appreciation of the global nature of the environmental sciences. We also are enhancing our Travel Learn Options with a push for our Bahamas course and our new NSF REU Costa Rica experience. We are also working to establish an international educational

		concern; • understand and visualize local, regional, national and global patterns associated with the environment, and the effects of human/animal and environmental interactions;		component for students in China. These initiatives will play out over the next few years, and we will be assessing them each year. For example, we will assess the students Bahamas and Costa Rican experiences from 2013 using various tools. One such tool we plan on using is the new NSF REU program BIO assessment instrument for both programs to demonstrate the level of learning that has occurred.
	Indirect Measure #1. We will use the Graduating Student Survey.	We will focus on the responses of students to the question of their ability to demonstrate a global perspective of science. We will target a mean score of 1.5 (I being the best score, 5 being the lowest).	At the time of writing this report we had not received any scores yet.	Although surveys were sent out, we did not receive any responses. We will work with the Office of Assessment to try to ensure we receive responses in the future.