University of Louisiana at Lafayette

Detailed Assessment Report
2015-2016 Geology BS

As of: 11/03/2016 03:17 PM CENTRAL

(Includes those Action Plans with Budget Amounts marked *One-Time, Recurring, No Request*.)

Mission / Purpose

Mission Statement: Our mission is to provide maximum value to our students, our community, and society through education and research focused on Energy and the Environment.

Value for our students – Our goal is maximizing the return on investment for undergraduate and graduate students enrolled in our programs. We strive to provide the strongest set of skills, experiences, and opportunities for students who aspire to careers (in industry or academics) within the fields of energy and/or the environment.

Value for our community – Our educational and research focus areas reflect the strengths and address the challenges of our region. Louisiana is at the forefront of the petroleum exploration and production industry and also boasts more than 40% of the wetlands in the U.S. These coastal wetlands are highly-productive and represent an enormous biological and economic resource. The state of Louisiana has identified "water management" and the "next wave of oil and gas production" as target areas for development. It is estimated that in Louisiana alone between 100,000 and 195,000 jobs will be created in these areas over the next 20 years. Our program will help provide the intellectual, research, and problem-solving capacity to address these needs.

Value for society – The sustainability of energy and environmental resources are two of the biggest scientific challenges we face nationally and globally. Our goal is to provide the next generation of scientists with the tools to work within these fields and a framework for addressing complex problem solving.

Relationship to UL's mission – Our mission reflects the University of Louisiana at Lafayette's commitment to achieving excellence in undergraduate and graduate education, in research, and in public service. Our focus on value for students, community, and society, mirrors UL's broader commitment to promote regional economic and cultural development and to find solutions to national and world issues.

Relationship to FIRST Louisiana – The Fostering Innovation through Research in Science and Technology (FIRST) in Louisiana plan was adopted by the Board of Regents as the framework for research within their master plan for higher education. The plan identifies Earth Sciences (among the foundational sciences) as a target for expansion and growth. Our focus areas and mission are directly aligned with the translational research domains of Energy, Environmental Sciences (and Coastal sciences) identified in FIRST Louisiana.

Vision:

Excellence – We will become a preeminent institution in the Gulf Coast Region (and the U.S.) for training students in fundamental and applied research in the areas of Energy and the Environment. Our strategic plan includes goals and metrics in the areas of

faculty productivity (teaching and research) and student success that are designed to evaluate our progress.

Opportunity – We will offer unique educational and research opportunities to support the success of our students. These opportunities include internships, networking, research experiences, flexible degree plans, and original course content. Our strategic plan includes goals and metrics in the areas of student success (placement, time-to-degree, internship participation, research participation, etc.) that are designed to evaluate our progress.

Community – We will serve the community through work in K-12 classrooms, teacher education programs, engagement with businesses, participation in philanthropic events, and local problem-solving. Our strategic plan includes goals and metrics involving employer surveys, recruiting activities, and enrollment numbers that are designed to evaluate our progress.

Student Learning Outcomes/Objectives, with Any Associations and Related Measures, Targets, Findings, and Action Plans

SLO 1: Mastery of field methods

Students will be able to master field methods, including: a) taking accurate and reliable field notes, b) constructing a geologic map, a cross section and a stratigraphic column; and c) observing the geologic relations of a field area and interpreting its geologic history based on these field observations.

Related Measures

M 1: Mastery in field methods assessments

We used two field-mapping projects, one on campus and one in West Texas, to assess mastery in field methods. The Black Tail Peak mapping project in Big Bend National Park is a 1-day mapping project in volcanic and sedimentary rocks combined with a cross section constructed from the map. The project on campus is a pace-and-compass map of surface features and use on the UL campus. Students have to apply their knowledge of field geology to produce maps, reports, and graphs. Difficult projects which require knowledge of many different geological subdisciplines, such as petrology, mineralogy, structural geology, and field methods (compass, maps, sections, etc). We also used the comprehensive final exam in field methods, which tests students ability in geological mapping, use of geologic compass, and construction of geologic cross sections.

Individual mapping projects from Field Methods (Geol 330) and Field Camp (Geol 400) are used to assess field skills. Especially field camp requires mastery of a very broad set of skills, ranging from petrology and structural geology to mapping techniques.

Field methods FA14; FA15; FA16 Field Camp: SU13, SU15, SU16

Source of Evidence: Project, either individual or group

Target:

At least 75% of the graduates in geology for the calendar year must meet the standard (70% or better).

Finding (2015-2016) - Target: Met

We used two field-mapping projects to assess mastery in field methods. The Onion Creek mapping project in Utah is a 1-day mapping project in a relatively

complex structure caused by a salt dome that penetrated to the surface. Terrain is rugged and topography challenging. The Sheep Mountain mapping project is a three-day project and entails the mapping of a large geologic feature, an anticline with several faults and smaller synclines. Especially the center part of the structure is both geologically and topographically challenging. The project requires the construction of two geologic cross sections. Outcomes range from 62% to 95% with an average of 77% (stdev: 9). The majority (83.3%) of all students achieved an acceptable grade with seven assignments below the standard. These two field projects demonstrate that most students were able to master field methods reasonably well.

Related Action Plans (by Established cycle, then alpha):

modified courses and curriculum

SLO (1) changed the criteria for success from previously 60% to 65%. In addition, we changed the learning environment in the field by introducing 2-way radios to enhance communication between students and instructors and to provide a safer environment. Students now have the opportunity to interact with the instructors throughout the day. Problems seem to persist in construction of cross sections. Will spend more time explaining the procedure and working through an example when in the field. Added new compass type to facilitate field measurement of tectonic features. To strengthen our program, we are also in the process of changing the curriculum after extensive review. We added new classes that are relevant for today's geoscience employment, e.g., "Digital Subsurface Analysis" and dropped several classes, e.g., "Landscape Evolution", that have lost importance since the time they were originally implemented.

Established in Cycle: 2009-2010
Implementation Status: In-Progress
Priority: High

Relationships (Measure | Outcome/Objective):
Measure: Mastery in field methods assessments |
Outcome/Objective: Mastery of field methods

Topo maps and cross sections

Although we met the standard despite raising it last cycle, a persistent problem with the field work aspect remains with the construction of cross sections and the identification of features on topographic maps. Both have been somewhat addressed in the field methods class (GEOL 330) and in structural geology (GEOL 314), but additional time in those classes, and during field camp (GEOL 400) itself, should be dedicated to foster these important skills. A review of pertinent techniques during field camp should be implemented.

Established in Cycle: 2015-2016
Implementation Status: Planned
Priority: High

Relationships (Measure | Outcome/Objective):
Measure: Mastery in field methods assessments |
Outcome/Objective: Mastery of field methods

Responsible Person/Group: Field camp director; field methods instructor; structural geology instructor

SLO 2: Software competency

Students will be competent in using widely used software programs to produce quality geologic illustrations and to analyze data sets and imagery. One project from the Computer Methods in Geology class was used to assess data analysis skills using computer software: students had to analyze and represent geological data with software commonly used in the geosciences. Two separate projects were assessed: one using Kaleidagraph (KG) to produce plots and add an age model to depth data, the second uses the Kindom Suite (SMT) to represent and analyze seismic data. Individual assignments and tests in Computer Applications (Geol 437), SMT class (Geol 411), and Analysis of Geological Data (Geol 435) will be used to assess our student's ability to use computer software applied to geological problems. Data Analysis SP10, SP11, SP12; Computer Applications FA10, FA11, FA12; SMT-class: FA10, FA11, FA12

Related Measures

M 2: Software competency

The midterm exam from the Analysis of Geologic Data class was used to assess data analysis skills using computer software: students had to analyze and represent geological data with software commonly used in the geosciences.

Individual assignments and tests in Computer Applications (Geol 437), SMT class (Geol 430), and Analysis of Geological Data (Geol 435) will be used to assess our student's ability to use computer software applied to geological problems. Data Analysis SP14, SP15, SP16; Computer Applications FA14, FA15, FA16; SMT-class: FA14, FA15, FA16

Source of Evidence: Project, either individual or group

Target:

At least 70% of the graduates in geology for the calendar year must meet the standard (65% or better).

Finding (2015-2016) - Target: Met

We used the midterm exam from our data analysis course as a measure to evaluate software competency because it relies entirely on the ability of the student to analyze geological data sets using typical software packages. Outcomes range from 63% to 100% with an average of 83% (Stdv=10). 95% of all students achieved an acceptable grade, with only one student below the standard. The data clearly demonstrate that most students are capable of geologic data analysis and representation with commonly used software.

Related Action Plans (by Established cycle, then alpha):

Criteria change, upgrades, and training

SLO (2) changed the criteria for success from previously 60% to 65%. We will also try to provide additional training to the instructor of the computer courses and have allocated funds to upgrade the computer lab software. As described in the "Field Methods Mastery" SLO, we are in the process of implementing changes to the curriculum and course descriptions.

Established in Cycle: 2009-2010
Implementation Status: In-Progress
Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Software competency | **Outcome/Objective:** Software competency

Increase standard

Because we continually met our software efficiency objectives, we will increase the standard in the following years to require 75% of our students to achieve at least 70%

Established in Cycle: 2015-2016
Implementation Status: Planned
Priority: High

Relationships (Measure | Outcome/Objective):
Measure: Software competency | **Outcome/Objective:** Software competency

SLO 3: Communication skills

Students will be able to communicate clearly and articulately their geologic knowledge, findings, and interpretations in written and oral presentations.

Related Measures

M 3: Communication skills

The final exam (essay test) of our stratigraphy course was used to assess whether students are capable of communicating geologic knowledge in written form.

Randomly selected presentations in the undergraduate seminar (Geol 499) will be used to assess the oral presentation skills. Essay tests in sedimentary petrology (Geol 339), carbonates (Geol 442), and stratigraphy (Geol 341) are used to assess the written communication skills of our geology majors.

Sedimentary Petrology: FA14, FA15, FA16; Carbonates: SP14, SP15, SP16; Stratigraphy: SP14, SP15, SP16; Undergraduate Seminar: SP14, SP15, SP16

Source of Evidence: Presentation, either individual or group

Target:
At least 70% of the graduates in geology for the calendar year must meet the standard (65% or better).

Finding (2015-2016) - Target: Met
We used an essay about the geologic history of North America, written at the end of field camp as a summary of what has been learned during the 6-week long field class, as a measure for the written communication skills in this assessment cycle. Outcomes for the written communication range from 70% to 95% with an average of 83% all students achieving an acceptable grade. The seminar participation grades range from 40% to 100% with an average of 88% and 89.5% of students achieving an acceptable grade. Both assessments show that our students are capable of communicating geological knowledge in writing and orally.

Related Action Plans (by Established cycle, then alpha):

changed criteria and grading policy

Changed the criteria for success from previously 60% to 65%. In addition, we changed the grading policy of the seminar class to encourage timely submission of materials.

Established in Cycle: 2009-2010
Implementation Status: In-Progress
Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Communication skills | **Outcome/Objective:** Communication skills

Writing improvement

Students appear to have problems articulating geologic information in writing probably because of a lack of practice and experience. We will try to improve this by increasing the number of written tests, assignments, term papers, etc. in all appropriate classes throughout the curriculum.

Established in Cycle: 2013-2014
Implementation Status: Planned
Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Communication skills | **Outcome/Objective:** Communication skills

Implementation Description: All appropriate geology courses to implement more written tasks.
Responsible Person/Group: All instructors

Analysis Questions and Analysis Answers

How were assessment results shared and evaluated within the unit?

Assessment results were distributed by email to all members of the geology faculty. Input to the assessment coordinator was provided either by email response or by oral communication.

Identify which action plans [created in prior cycle(s)] were implemented in this current cycle. For each of these implemented plans, were there any measurable or perceivable effects? How, if at all, did the findings appear to be affected by the implemented action plan?

We dedicated more resources in the field methods class to the construction of geologic cross sections, the proper use of the Brunton compass and the use of topographic maps. As a result, we were able to raise the standard and still meet the raised standard. Although improvements are evident, we still need to concentrate on improving the field skills of our student population. Weaknesses in writing skills are more difficult to address. We tried to increase the writing throughout the curriculum, but outside the English department, where it is the mission to improve English, the resources are simply not put towards this goal. Overall, the preparedness of our students seems to be adequate.

What has the unit learned from the current assessment cycle? What is working well, and what is working less well in achieving desired outcomes?

We have learned that overall our student population is learning the key elements of their profession, they are proficient in communicating geologic ideas, can solve geologic problems in the field, and use computer software to present and analyze geologic data. The success rate in this cycle was - within a few percentage points - identical to previous cycles, although we were able to raise some of the standards. The efficiency with which we teach our students the most important skills has improved because of the assessment analysis through the past five years. Of course, problems persist, especially the writing skills appear to be difficult to address in the frame of a geology program.