Assessment:ProgramFourColumn

Program (ALP) - Geology MS

College or Division: Arts and Sciences
Department: Biology, Geology and Physical Sciences
Assessment Coordinator: Dr. Elizabeth A. Measures
Strategic Plan Goal(s) Supported: Strategic Goal 1 - Promote growth in academics - research - and artistic excellence

Statement of Purpose: Students must successfully complete either, A) 30 semester credit hours of geology including successfully defending a thesis, or B) 36 semester credit hours of coursework in geology and a comprehensive written exam in order to earn the MS degree. Additionally, BOTH OPTIONS require completion of a comprehensive oral examination before a degree is awarded. The graduate geology curriculum is designed to meet learning outcomes within four areas: 1) sedimentary geology, 2) igneous/metamorphic geology and structure/tectonics, 3) geological field, lab and research techniques/technology, and 4) communication in both oral and written format. Toward achieving this goal, students must take at least one graduate course from each major area of study (SLO 1 through 3 above), before concentrating on an area of interest. Learning objectives are built through the knowledge gained from the course content covered in the thirty to thirty-six hours taken. All courses are designed to train students in their respective areas. As with the undergraduate program, the importance of field and laboratory experiences are emphasized, encouraging the students with outdoor learning opportunities, modern lab techniques, and field experiences to enhance the learning environment. Students gain additional mastery of these program learning objectives through the process and ultimate completion of a Master's thesis. The process of designing a study, applying the scientific method, implementing methodology, analyzing results, and writing up and presenting their findings is a powerful tool toward preparing students for a future in geology. For this reason, all MS students are strongly encouraged to complete a thesis, with the non-thesis option being the path least encouraged.
The mission of the Geology M.S. Program, in the geologically diverse Big Bend region, is to provide Sul Ross State University Geology graduate students education and research opportunities that is comprehensive, accessible and life changing through teaching and research experience that is of the highest quality.

Annual Updates

2018 - 2019

Evidence of Improvement from Previous Assessment Cycle: For the 2018-2019 cycle, of the 8 assessments (covered in the 4 SLO's), all 8 met their target goal. This is an improvement over the previous cycle where there was one assessment that had no results because courses used for the assessment were not taught in that cycle.
All 8 assessments exceeded their target goals for this cycle. However, only 7 of the 8 assessments showed an increase over the previous cycle (2017-2018): three increased by 2 percentage points, two increased by 3 percentage points, one increased by 6 percentage points and the last one increased by 8 percentage points.
There was improvement in the current cycle (2018-2019) over the previous cycle (2017-2018) specifically in the following:
1) SLO 1B went from 88% (2017-2018) to 90% in this cycle.
Students performed better on sedimentary questions asked during the thesis defense so it appears that having the students read texts/articles related to sedimentary geology was successful.
2) SLO 2A was not applicable in 2017-2018 but went from 90% (2016-2017) to 93% in this cycle.
Student learning appears to have been enhanced through homework assignments tied to readings in the text, written assignments tied to samples, and discussions of journal articles.
3) SLO 2B went from 85% (2017-2018) to 87% in this cycle.

Students performed better on igneous/metamorphic and structure/tectonics questions asked during the thesis defense so it appears that having the students read texts/articles related to igneous/metamorphic geology and and structure/tectonics was successful.
4) SLO 3A went from 90% (2017-2018) to 96% in this cycle.
Having the students do a field or lab research term project utilizing new and/or different techniques and technologies seems to have been successful in enhancing student learning. Also incorporating field and lab work and techniques/technology in course labs also seems to have been successful.
5) SLO 3B went from 90% (2017-2018) to 92% in this cycle.
Students performed better on field/lab research/technique questions asked during the thesis defense so it appears that having the students get prior experience with field/lab methodology in courses was successful.
6) SLO 4A went from 83% (2017-2018) to 86% in this cycle.
Having the students write and present term reports in courses seems to have been successful in enhancing student learning. Also having the major advisor work with the student on the written thesis proposal and oral presentation on the proposed research seems to have been successful in enhancing student learning.
7) SLO 4B went from 84% (2017-2018) to 92% in this cycle.
Students produced better written theses and had better oral presentations/defenses of their thesis research so it appears that having the students get prior experience with research report writing and giving oral presentations in their courses and getting guidance from their major advisor was successful.
Review History: Reviewer #1 Name, Date, and Comments: Dr. Mark Saka, August 1, 2019
Review History: Reviewer #2 Name, Date, and Comments: Dr. Ryan Luna, August 1, 2019
Review History: Reviewer #3 Name, Date, and Comments: Dr. Audrey Taylor, August 1, 2019

Student Learning Outcomes	*Assessment Methods*	*Results*	*Use of Results*
SLO 1 - The student will be able to apply diverse bodies of Geologic information in the area of advanced sedimentary geology. **Outcome Status:** Active	**Departmental Comprehensive Exam -** a. Comprehensive final exams that cover elements of advanced sedimentary geology are administered in the relevant courses: GEOL 5320 Advanced Paleontology, GEOL5326 Carbonate Petrology, and GEOL 5328 Advanced Sedimentation. These courses are offered on a rotation and because of this rotation the same class will not occur in successive academic assessment cycles. Therefore any of these 3 courses will be used as an assessment and will be considered equal. **Target:** The goal of the program is to improve students' learning achievement to a level so that the minimum average score on the	**Reporting Period:** 2018 - 2019 **Conclusion:** Target Met Results from 4 students completing GEOL 5326 in Fall 2018. The average score on the comprehensive final exam, composed of questions over carbonate rocks (an area of advanced sedimentary geology), was 86%. The average on the assessment tool met (exceeded) the target goal. Students showed competence in the area of advanced sedimentary geology. (05/28/2019)	**Use of Results:** This goal was met (exceeded; 6% points above target score but 2% points below previous cycle) but there will be continuing modification to course material based on strategies listed below. The high score for the assessment may be a result of the strategies incorporated and discussed in the past several cycles: 1) samples that students need to examine will be accompanied by a written assignment or a quiz/exam, 2) homework will be assigned over readings, 3) expansion of the term project over local carbonate units, and 4) ensuring that material in PowerPoints and videos is current and pertinent. (05/30/2019)

Student Learning Outcomes	Assessment Methods	Results	Use of Results
	designated assessment is 80%. **Supervisor Evaluation -** b. Thesis defense, GEOL 6302 Thesis Defense, is the summative assessment of the application of knowledge that covers advanced sedimentary geology. **Target:** The goal of the program is to improve students' learning achievement to a level so that the minimum average score on the designated assessment is 80%. Graduate students are expected to do "A" and "B" level work; a "C" is not acceptable and not considered passing. Therefore the minimum passing score would be a "B" which equates to a minimum of 80%.	**Reporting Period:** 2018 - 2019 **Conclusion:** Target Met Results from 1 student completing GEOL 6302 in 2018-2019 assessment cycle. The average score was 90% on a series of advanced sedimentary geology questions asked as part of the thesis defense. Questions covered 1) thesis-specific sedimentary geology material and 2) general knowledge of sedimentary geology. The average on the assessment tool met (exceeded) the target goal. The students showed competence in the area of advanced sedimentary geology. (05/28/2019)	**Use of Results:** This goal was met (exceeded; 10% points above target score and 2% points above previous cycle) but there will be continuing modification. The high score for the assessment may be a result of the strategy incorporated and discussed in the past several cycles of assigning recommended readings in sedimentary geology prior to defense. The readings will continue to be evaluated and the list modified. The high score for the assessment may also be a result of the student doing research on a sedimentary geology related project. The student was also a very outstanding student throughout their time here so this high score on the assessment was not a surprise. Again, the Geology faculty did not meet but should meet prior to start of Fall 2019. (05/30/2019)
SLO 2 - The student will be able to apply diverse bodies of Geologic information in the areas of advanced igneous/metamorphic processes, structure and tectonics. **Outcome Status:** Active	**Project -** a. Term projects that cover elements of advanced igneous processes, metamorphic processes, structure and tectonics are administered in the relevant courses: GEOL 5306 Advanced Structural Methods, GEOL 5308 Advanced Igneous Petrology, GEOL 5312 Volcanology, GEOL 5316 Trace Elements in Magmatic Systems, and GEOL 5304 Special	**Reporting Period:** 2018 - 2019 **Conclusion:** Target Met Results from 4 students completing GEOL 5306 in Spring 2019. The average score on the term project on an aspect of advanced structure and tectonics was 93%. The average on the assessment tool met (exceeded) the target goal. The students showed competence in the area of advanced igneous processes, metamorphic processes, structure and tectonics. (05/28/2019)	**Use of Results:** This goal was met (exceeded; 13% points above target score and 3% points above last cycle, 2016-2017, where there was data reported). The program was able to hire a tenure-track PhD in the area of vertebrate paleontology but they also had experience in the area of structural geology and taught the Advanced Structural Methods

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	Topics (as applicable). These courses are offered on a rotation and because of this rotation the same class will not occur in successive academic assessment cycles. Therefore any of these 5 courses will be used as an assessment and will be considered equal. **Target:** The goal of the program is to improve students' learning achievement to a level so that the minimum average score on the designated assessment is 80%.		course. The high score on the assessment can be attributed to the ability of the instructor since this was the first time they developed and taught this course. However, the instructor probably noted any difficult areas and will address those the next time the course is offered. It will be recommended that successes in other areas was achieved through: 1) samples accompanied by a written assignment or a quiz/exam, 2) homework assigned over readings, and 3) material in PowerPoints and videos is current and pertinent. (05/30/2019)
	Written Assignment - b. Thesis defense, GEOL 6302 Thesis Defense, is the summative assessment of the application of knowledge that covers advanced igneous processes, metamorphic processes, structure and tectonics. **Target:** The goal of the program is to improve students' learning achievement to a level so that the minimum average score on the designated assessment is 80%. Graduate students are expected to do "A" and "B" level work; a "C" is not acceptable and not considered passing. Therefore the minimum passing score would be a "B" which equates to a minimum of 80%.	**Reporting Period:** 2018 - 2019 **Conclusion:** Target Met Results from 1 student completing GEOL 6302 in 2018-2019 assessment cycle. The average score was 87% on a series of questions over advanced igneous/metamorphic processes, structure and tectonics asked as part of the thesis defense. Questions covered 1) thesis-specific igneous/metamorphic material as well as structure and tectonic material, and 2) general knowledge of igneous/metamorphic processes, structure and tectonics. The average on the assessment tool met (exceeded) the target goal. The students showed competence in the area of advanced igneous processes, metamorphic processes, structure and tectonics. (05/28/2019)	**Use of Results:** This goal was met (exceeded; 7% points above target score and 2% points above previous cycle) but there will be continuing modification. The high score for the assessment may be a result of the strategy incorporated and discussed in the past several cycles of assigning recommended readings in igneous and metamorphic geology as well as structure and tectonics prior to defense. The readings will continue to be evaluated and the list modified. The high score for the assessment may also be a result of the student doing research on a project that involved some aspects of tectonics and igneous geology.

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			The student was also a very outstanding student throughout their time here so this high score on the assessment was not a surprise. Again, the Geology faculty did not meet but should meet prior to start of Fall 2019. (05/30/2019)
SLO 3 - The student will be able to apply diverse bodies of Geologic information to field and lab research and techniques. **Outcome Status:** Active	**Project -** a. Term projects that cover elements of field and lab research and techniques are administered in the relevant courses: GEOL 5401 Remote Sensing, GEOL 5402 Interdisciplinary Geographic Information Systems, GEOL 5403 Advanced Geographic Information Systems, or GEOL 5304 Special Topics (as applicable). These courses are offered on a rotation and because of this rotation the same class will not occur in successive academic assessment cycles. Therefore any of these 4 courses will be used as an assessment and will be considered equal. **Target:** The goal of the program is to improve students' learning achievement to a level so that the minimum average score on the designated assessment is 80%.	**Reporting Period:** 2018 - 2019 **Conclusion:** Target Met Results from 9 students completing GEOL 5403 in Spring 2019. The average score on the term project, which required knowledge of GIS field and lab techniques, was 96%. The average on the assessment tool met (exceeded) the target goal. Students showed competency in the area of field and lab research and techniques. (05/28/2019)	**Use of Results:** This goal was met (exceeded; 16% points above target score and 6% points above previous cycle) but there will be continuing modification to course material based on strategies listed below. The high score for the assessment may be a result of the strategies incorporated and discussed in the past several cycles: 1) expanding use/demonstration of technology (LiDAR, GIS, GPS etc.) in courses, 2) having students do lab/field exercise(s) as well as a term project, and 3) ensuring that technology/material is current and pertinent. (05/30/2019)
	Written Assignment - b. Thesis defense, GEOL 6302 Thesis Defense, is the summative assessment of the application of knowledge that covers field and lab research and techniques. **Target:** The goal of the program is to	**Reporting Period:** 2018 - 2019 **Conclusion:** Target Met Results from 1 student completing GEOL 6302 in 2018-2019 assessment cycle. The average score was 92% on a series of questions over field research and techniques, as well as lab research and techniques asked as part of the thesis defense. Questions	**Use of Results:** This goal was met (exceeded; 12% points above target score and 2% points above previous cycle) but there will be continuing modification based on strategies listed below. The high score for the assessment

Student Learning Outcomes	Assessment Methods	Results	Use of Results
	improve students' learning achievement to a level so that the minimum average score on the designated assessment is 80%. Graduate students are expected to do "A" and "B" level work; a "C" is not acceptable and not considered passing. Therefore the minimum passing score would be a "B" which equates to a minimum of 80%.	covered 1) thesis-specific field and lab techniques as well as research methodology, and 2) general knowledge of field and lab research and techniques. The average on the assessment tool met (exceeded) the target goal. The students showed competence in the area of geologic research in the field and lab and geologic lab and field techniques. (05/28/2019)	may be a result of the strategy incorporated and discussed in the past several cycles of: 1) continued use of field and lab research/techniques in courses prior to thesis research, and 2) advisors working closely with their thesis students on research conducted in the field and lab. The high score for the assessment may also be a result of the student having experience as a lab teaching assistant and helping teach field and lab techniques to undergraduates. The student also incorporated various field research techniques and lab research technology as part of their thesis. The student was also a very outstanding student throughout their time here so this high score on the assessment was not a surprise. Again, the Geology faculty did not meet but should meet prior to start of Fall 2019. (05/30/2019)
SLO 4 - The student will be able to communicate diverse bodies of Geologic information through the standard scientific format of an oral presentation based on a written paper. **Outcome Status:** Active	**Written Assignment -** a. Thesis proposal, GEOL 6301 Thesis Proposal, is the summative assessment of communicating an original research topic through the scientific format of an oral presentation based on a written paper. The graduate student presents the topic they will study for their MS to their thesis committee in a lecture/oral format; the presentation is based on the written thesis proposal the graduate student	**Reporting Period:** 2018 - 2019 **Conclusion:** Target Met Results from 2 students completing GEOL 6301 in 2018-2019 assessment cycle. The average score on the written and oral proposal was 86%. The average on the assessment tool met (exceeded) the target goal. Students were able to submit an acceptable written summary of their proposed masters research. Students were also able to orally present a summary of their proposed masters research. The graduate students showed competence in the area of	**Use of Results:** This goal was met (exceeded; 6% points above target score and 3% points above previous cycle) but there will be continuing modification based on strategies listed below. The high score for the assessment may be a result of the strategies incorporated and discussed in the past several cycles: 1) ensuring that the graduate students have report writing and presentation

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	has submitted to their thesis committee. The thesis committee determines whether the graduate student has successfully proposed (adequately explained/ communicated both orally and in writing) their potential MS research topic. **Target:** The goal of the program is to improve students' learning achievement to a level so that the minimum average score on the designated assessment is 80%. Graduate students are expected to do "A" and "B" level work; a "C" is not acceptable and not considered passing. Therefore the minimum passing score would be a "B" which equates to a minimum of 80%.	scientific communication. (05/28/2019)	experience through course-work, and 2) ensuring that the major advisor works with each student on the written proposal and oral presentation. The high score may also be a result of both graduate students having experience as teaching assistants which also prepared them for writing as well as organizing and delivering a lecture. A new course in graduate research methodology has been created and will be required starting Fall 2019. It will address aspects of research, writing, citation formatting and document formatting as these relate to the written proposal. Again, the Geology faculty did not meet but should meet prior to start of Fall 2019. (05/30/2019)
	Presentation/Performance - b. Thesis defense, GEOL 6302 Thesis Defense, is the summative assess-ment of communicating original research results through the standard scientific format of an oral presentation based on a written paper. The graduate student pre-sents their research re-sults to their thesis com-mittee in a lecture/ oral format; the presentation is based on the written thesis the graduate student has submitted to their thesis committee. The thesis committee determines whether the graduate student has successfully defended (adequately	**Reporting Period:** 2018 - 2019 **Conclusion:** Target Met Results from 1 student completing GEOL 6302 in 2018-2019 assessment cycle. The average score on the evaluation of the thesis, both written and oral presentation, was 92%. The average on the assessment tool met (exceeded) the target goal. The students showed competence in the area of communicating original research results through the standard scientific format of an oral presentation based on a written paper. (05/28/2019)	**Use of Results:** This goal was met (exceeded; 12% points above target score and 8% points above previous cycle) but there will be continuing modification based on strategies listed below. The high score for the assessment may be a result of the graduate student having gone through a similar process on their thesis proposal. The high score may also be a result of the strategies incorporated and discussed in the past several cycles: 1) ensuring that the graduate students have report writing and presentation

Student Learning Outcomes	Assessment Methods	Results	Use of Results
	explained/ communicated both orally and in writing) their MS research results. **Target:** The goal of the program is to improve students' learning achievement to a level so that the minimum average score on the designated assessment is 80%. Graduate students are expected to do "A" and "B" level work; a "C" is not acceptable and not considered passing. Therefore the minimum passing score would be a "B" which equates to a minimum of 80%.		experience through course-work, and 2) ensuring that the major advisor works with each student on the written thesis and oral presentation. The high score for the assessment may also be a result of the student having experience writing an abstract and presenting at regional geological society meetings as well as writing an article for a geologic guidebook and participating in a field symposium tied to the guidebook. The student was also a very outstanding student throughout their time here so this high score on the assessment was not a surprise. Again, the Geology faculty did not meet but should meet prior to start of Fall 2019. (05/30/2019)