



Program Review Self-Study Template

Academic unit: Geology _____

College: Fairmount College of Liberal Arts and Sciences _____

Date of last review 2012 _____

Date of last accreditation report (if relevant) NA _____

List all degrees described in this report (add lines as necessary)

Degree: BS Geology _____ CIP* code: 40.0601 _____

Degree: MS EEPS _____ CIP code: 40.0601 _____

Degree: _____ CIP code: _____

*To look up, go to: Classification of Instructional Programs Website, <http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55>

Faculty of the academic unit (add lines as necessary)

Name Signature

Dr. William Bischoff _____ *WDB*

Dr. Collette Burke _____ *CB*

Dr. Keith Gray _____ *KOG*

Dr. William Parcell _____ *WP*

Dr. Andrew Swindle _____ *AS*

Submitted by: *William C. Parcell*
William C. Parcell, Chair Geology
(name and title)

Date *4-1-15*

In yellow highlighted areas,
data will be provided

1. Departmental purpose and relationship to the University mission (refer to instructions in the WSU Program Review document for more information on completing this section).

a. University Mission:

The mission of Wichita State University is to be an essential educational, cultural, and economic driver for Kansas and the greater public good.

b. Program Mission (if more than one program, list each mission):

Geology BS Program

The mission of the Department of Geology program is to prepare students with the scientific knowledge to proceed to geologic careers in industry, government, or to be admitted to a geology graduate program. Students are prepared for certification/registration on a state or national level where appropriate. Students are prepared with the background and skills to enable them to continue to learn, develop and adapt to changing conditions throughout their careers.

EEPS MS Program

The mission of the EEPS Program is to train scientists, professionals, and educators who will be well equipped with general knowledge and skills in methodology, critical and creative thinking in scientific research, and advanced knowledge and skills in geology, environmental science, or physics.

c. The role of the program (s) and relationship to the University mission: Explain in 1-2 concise paragraphs.

The degree programs offered through the Department of Geology include a Bachelor of Science in Geology and a Master of Science in EEPS which support the mission of the College of Liberal Arts and Sciences to “cultivate intellectual curiosity and foster contemplation of the human experience and the natural world,” through teaching (1) a curriculum covering the theoretical and applied fields of geology and allied sciences, (2) supporting scholarly research, and (3) supporting professional service.

In similar ways, we support the mission of the University in (1) preparing students with the scientific knowledge expected for geologic careers in national or international industry, government, or academia, (2) transmitting a high quality training of students in sustainable approaches to energy, water and mineral resource exploration and management, and (3) continuing a long history of collaboration with and staffing of local petroleum and environmental companies.

d. Has the mission of the Program (s) changed since last review? Yes No

If yes, describe in 1-2 concise paragraphs. If no, is there a need to change?

There is no need for mission change.

e. Provide an overall description of your program (s) including a list of the measurable goals and objectives of the program (s) (programmatic). Have they changed since the last review?

Yes No

If yes, describe the changes in a concise manner.

Description of Undergraduate BS Geology Program

The Department's BS in Geology program is based on a traditional geoscience education format. There are no regional or national accreditation requirements for the program. The BS degree provides comprehensive training in geology and allied natural sciences, prepares graduates for professional work in industry or government, as well as for graduate study in any field of geoscience or environmental sciences. The BS curriculum requires a minimum of 45 hours in geology. In addition, students are required to complete Calculus I and II, Elementary Statistics, General and Inorganic Chemistry, and General College Physics I and II or University Physics I and II. Therefore, the department recommends that students who expect to earn the BS in geology should enter the program with a strong background in geometry, trigonometry, algebra, and chemistry.

The program goals include:

- Prepare individuals for employment in geologic careers in industry, government or academia
- Foster professional growth and commitment to lifelong learning for students and faculty
- Support and encourage scholarly research in the geological sciences
- Ensure efficient and effective program operations consistent with the college, University and profession.

*Please see attached **Appendix I** for elaboration of the above goals.*

Currently, the main outcome measure of student learning is performance in the department's geology courses as described further in section 3c.

Description of Masters EEPS Program

The EEPS program offers students an opportunity for faculty-directed, multidisciplinary, graduate education and research to investigate Earth processes. It emphasizes knowledgeable development and utilization of our planet's resources and the consequences of human activity on the environment. The EEPS curriculum requires 30 – 36 hours in EEPS, Geology, Physics or related disciplines. The department recommends that students entering the MS in EEPS should have completed Calculus I and II, Elementary Statistics, General and Inorganic Chemistry, and General College Physics I and II or University Physics I and II. To meet the requirements of differing career goals, students may choose a thesis, internship or non-thesis option. The EEPS program is designed to:

- Prepare individuals for employment in environmental, geologic and physics careers in industry, government or academia
- Foster professional growth and commitment to lifelong learning for students and faculty
- Support and encourage independent scholarship and develop competence in research in the physical and environmental sciences

*Please see attached **Appendix I** for elaboration of the above tools used to assess the above objectives.*

Currently, the main outcome measure of student learning is performance in the required EEPS courses. This will be addressed further in section 3c.

2. Describe the quality of the program as assessed by the strengths, productivity, and qualifications of the faculty in terms of SCH, majors, graduates, and scholarly/creative activity (refer to instructions in the WSU Program Review document for more information on completing this section).

Complete the table below and utilize data tables 1-7 provided by the Office of Planning Analysis (covering SCH by FY and fall census day, instructional faculty; instructional FTE employed; program majors; and degree production).

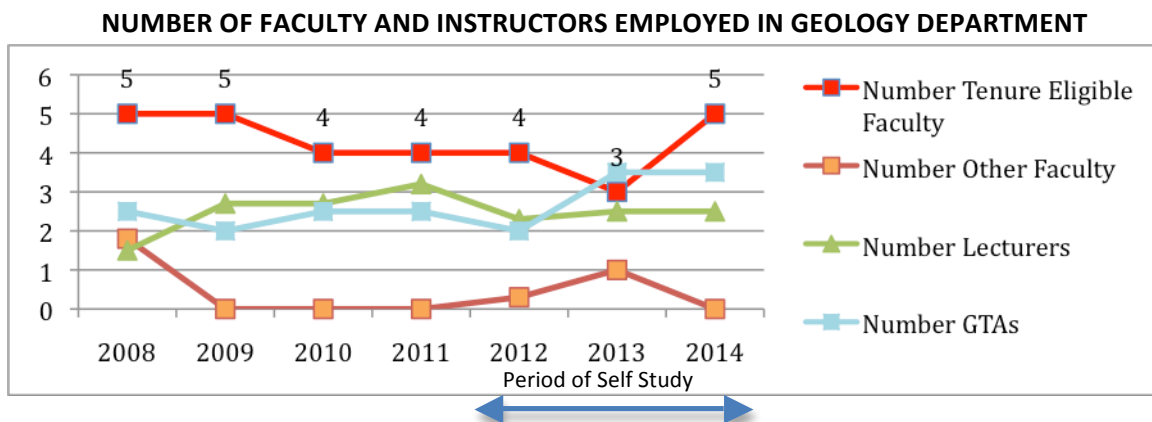
Scholarly Productivity	Number Journal Articles		Number Presentations		Number Conference Proceedings		Performances			Number of Exhibits		Creative Work		No. Books	No. Book Chaps.	No. Grants Awarded or Submitted	\$ Grant Value
	Ref	Non-Ref	Ref	Non-Ref	Ref	Non-Ref	*	**	***	Juried	****	Juried	Non-Juried				
Year 1 (2012)	4		4		10											2	\$30,000
Year 2 (2013)	5		3		8											1	\$30,000
Year 3 (2014)	6		2		6											2	\$1.5 million

* Winning by competitive audition. **Professional attainment (e.g., commercial recording). ***Principal role in a performance. ****Commissioned or included in a collection.

- Provide a brief assessment of the quality of the faculty/staff using the data from the table above and tables 1-7 from the Office of Planning Analysis as well as any additional relevant data. Programs should comment on details in regard to productivity of the faculty (i.e., some departments may have a few faculty producing the majority of the scholarship), efforts to recruit/retain faculty, departmental succession plans, course evaluation data, etc.

Provide assessment here:

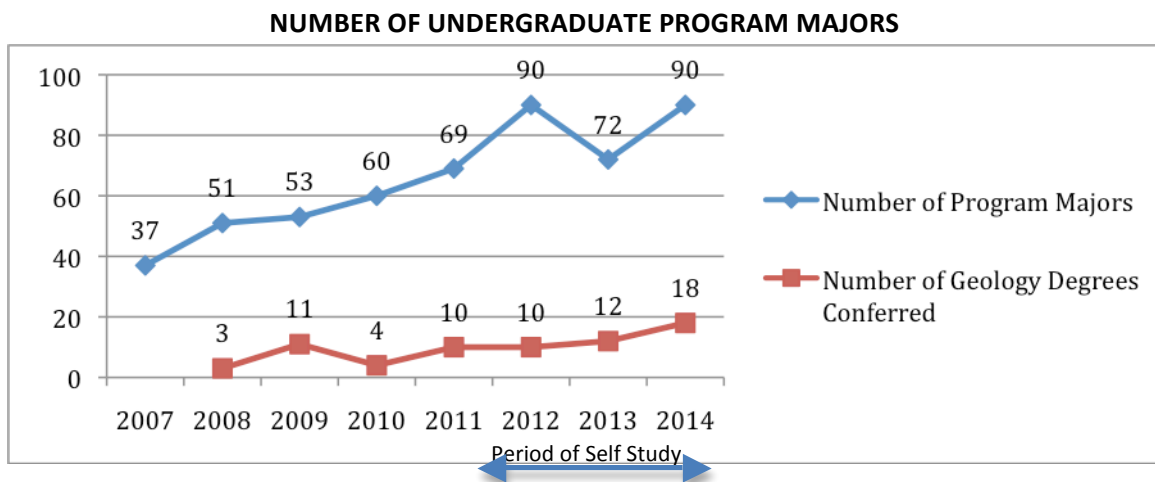
The Geology Department underwent dramatic and unexpected faculty turnover during the past three years (see Graph 2a below). Despite these disruptions, the department continued to produce quality published research and grant activity. In spring 2012, the geology department was composed of four professors (Burke, Gries, Mazzullo and Parcell), and Bischoff (LAS Dean) at part time teaching. Professor Mazzullo began a planned three-year phased retirement in spring 2012 at 50% teaching, research and service. During 2012, the department produced four journal articles and ten conference proceedings in addition to obtaining grants amounting to \$30,000. In fall 2012, Bischoff returned from the LAS Dean's office to full time department teaching and research. Mazzullo decided to end his phased retirement early in spring of 2013. His departure coincided with the unexpected death of faculty member John Gries in January 2013. During that year, the department was still able to publish five journal articles and eight published conference abstracts as well as continuing grant activities. In spring 2014, Burke took medical leave from the university. Two full-time faculty members (Bischoff and Parcell) and a visiting professor (Skinner) remained to cover the BS, BA undergraduate curriculum and the graduate geology courses in the EEPS program. A successful search of two new faculty (Gray and Swindle) in 2013-2014 brought the department new teaching capacity, research directions and mentorship for students. In 2014 the department produced six journal articles, six conference proceedings and over \$1.5 million in grants, subcontracts and software donations.



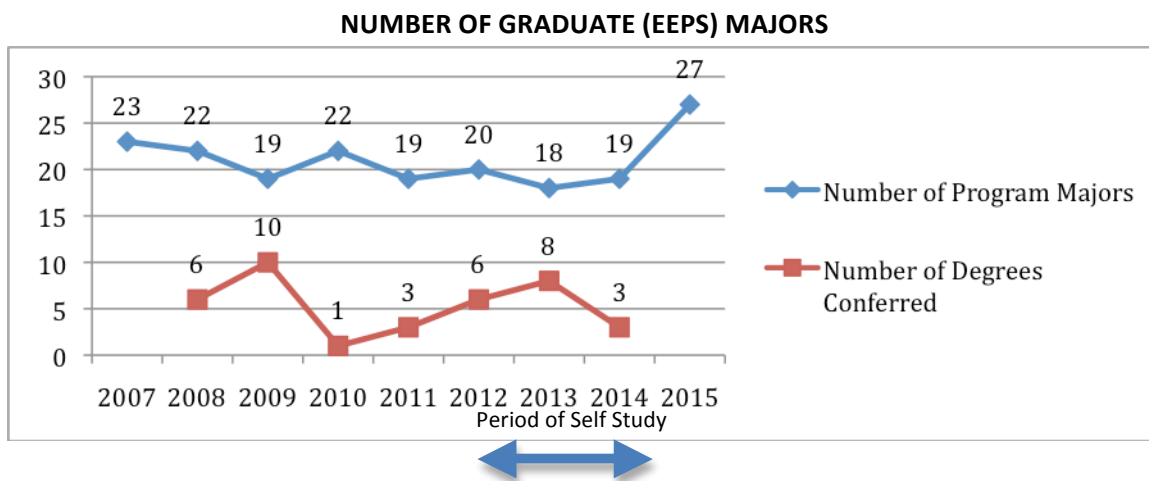
Graph 2a: Geology Instructional FTE Employed (by Fall Census Day)

In response to faculty reductions between 2012 and 2014, the department took a two-fold approach to cover program needs. The first and immediate need was to ‘plug the holes’ in course instruction, including critical majors courses. By necessity, faculty course loads increased and the department was granted a request to hire a temporary faculty member for the 2013-14 academic year. In addition, faculty taught more large enrollment introductory geology courses to support the General Education curriculum. The department was successful in hiring a temporary, one-year assistant professor for 2013-2014 and maintained instructor positions. It also increased the number of GTAs to aid in course and lab instruction. A second important, long-term goal was to hire new tenure-eligible faculty to replace losses. The department ran searches for two faculty positions in 2013-2014 and was successful in both. The two new faculty (Gray and Swindle) began in the Fall 2014 semester, bringing the department to five tenure/tenure-eligible faculty. Currently, all professors hold doctoral degrees and department instructors hold either doctorate or masters degrees.

Despite the unexpected faculty losses during the past three years, the department has continued to maintain a historically high enrollment of undergraduate majors, reaching 90 in 2012, and continues to increase the number of Geology graduates (18 students in 2014) (see Graph 2b below). The EEPS graduate student numbers have averaged around 20 during the period of this self-study but are projected to rise with increased enrollment in 2015 (see Graph 2c below: 27 students enrolled in spring 2015).

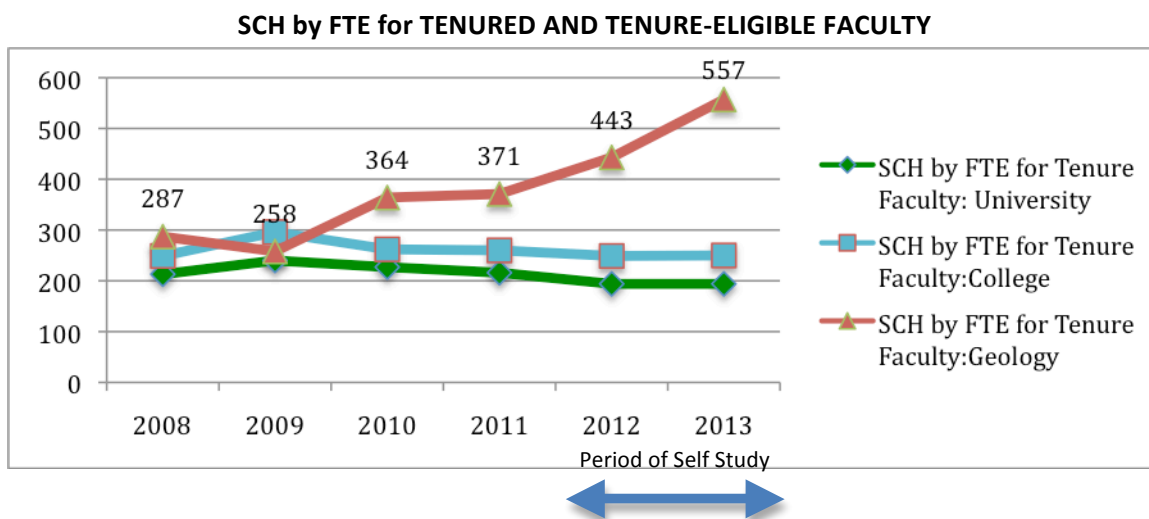


Graph 2b: Geology Undergraduate Degree Enrollment (by Fall Census Day)



Graph 2c: EEPS Graduate Program Enrollment (by Fall Census Day)

To accommodate large student enrollments in both majors and non-major courses, student credit hour (SCH) production by tenured faculty has steadily increased throughout the review period (see Graph 2d below). The SCH by faculty FTE has exceeded both college and university averages since 2010. In order to compensate for (1) faculty losses and (2) increasing number of undergraduate majors, the faculty took on overloads in order to sustain the department's overall SCH. In addition, faculty increased the offerings and capacity of their online introductory courses (GEOL 102). With the addition of new faculty in fall 2014, the department foresees stabilization of SCH by FTE in the future. It is also forecast that the return to pre-2010 faculty numbers will increase research productivity.



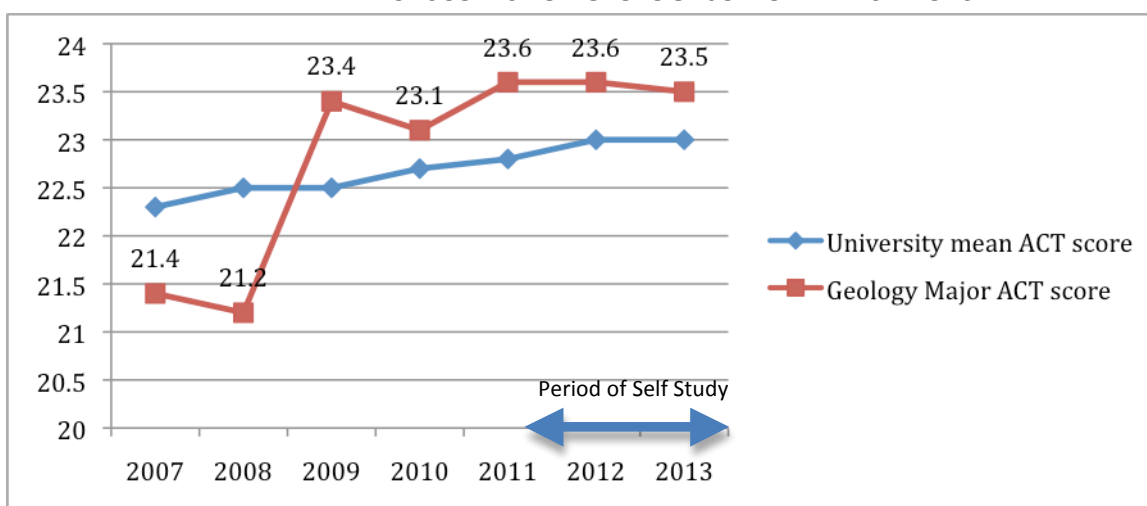
Graph 2d: Student Credit Hour (SCH) production by FTE for Tenure Eligible Faculty

3. **Academic Program: Analyze the quality of the program as assessed by its curriculum and impact on students for each program (if more than one). Attach updated program assessment plan (s) as an appendix (refer to instructions in the WSU Program Review document for more information).**

- a. For undergraduate programs, compare ACT scores of the majors with the University as a whole. (Evaluate table 8 [ACT data] from the Office of Planning and Analysis).

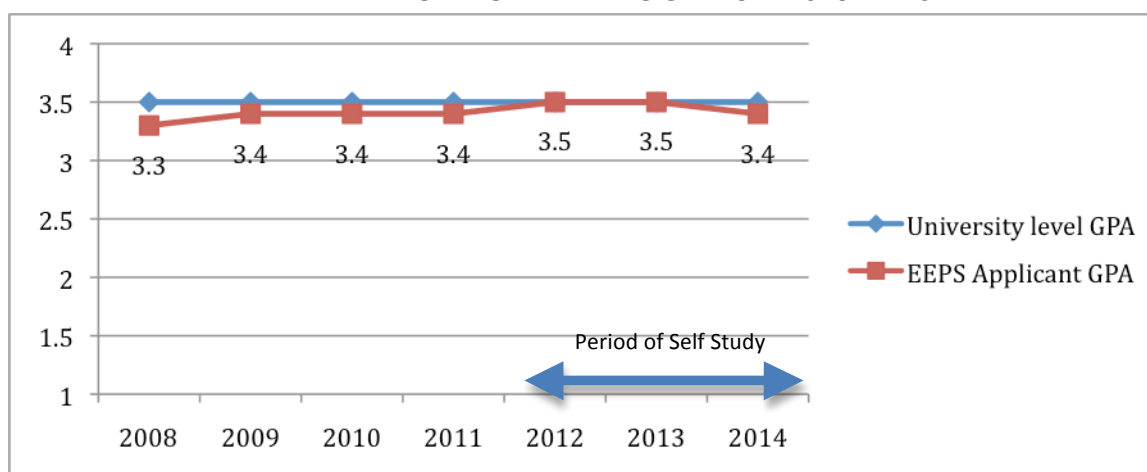
The Geology undergraduate students have consistently ranked higher in ACT scores than the university average. The GPAs of incoming graduate students in the EEPS program rank at or just below the university average of 3.5.

MEAN ACT SCORES FOR GEOLOGY JUNIOR AND SENIORS



- b. For graduate programs, compare graduate GPAs of the majors with University graduate GPAs. (Evaluate table 9 [GPA data] from the Office of Planning and Analysis)

MEAN GPA FOR ENTERING GRADUATE STUDENTS



- c. Identify the principal learning outcomes (i.e., what skills does your Program expect students to graduate with). Provide aggregate data on how students are meeting those outcomes in the table below. Data should relate to the goals and objectives of the program as listed in 1e. Provide an analysis and evaluation of the data by learner outcome with proposed actions based on the results.

Learning Outcomes: Geology BS Program

Learning Outcomes (most programs will have multiple outcomes)	Assessment Tool (e.g., portfolios, rubrics, exams)	Target/Criteria (desired program level achievement)	Results	Analysis
The Geology B.S. program will foster comprehensive training among students in geosciences that will enable them to demonstrate skills in integrating sedimentary/paleontology, igneous and metamorphic rocks.	Option 1: Lab project in GEOL 324 "Petrology"	Target is a 90% passing assignments; minimum 70% passing assignments	2012: 100% passed project, n=18	Target surpassed; no course content to be modified.
			2013: 92.85% passed project n = 14	Target surpassed; no course content to be modified.
			2014: 100% passed project n = 23	Target surpassed; no course content to be modified.
	Option 2: Final exam in GEOL 570 "Biogeology"	Target is a 90% passing assignments; minimum 70% passing assignments	2012: see results from option 1	NA
			2013: see results from option 1	NA
			2013: see results from option 1	NA
The Geology B.S. program will foster comprehensive training among students in geosciences that will enable them to demonstrate skills in application of mapping to solve geologic problems.	Mapping project in capstone course Geol 640 "Field Geology."	Target is a 90% passing assignment; minimum 70% passing assignments	2012: 100% passed project, n=5	Target surpassed; no course content to be modified.
			2013: 100% passed project n = 12	Target surpassed; no course content to be modified.
			2014: 100% passed project n = 16	Target surpassed; no course content to be modified.

Learning Outcomes: EEPS MS Program

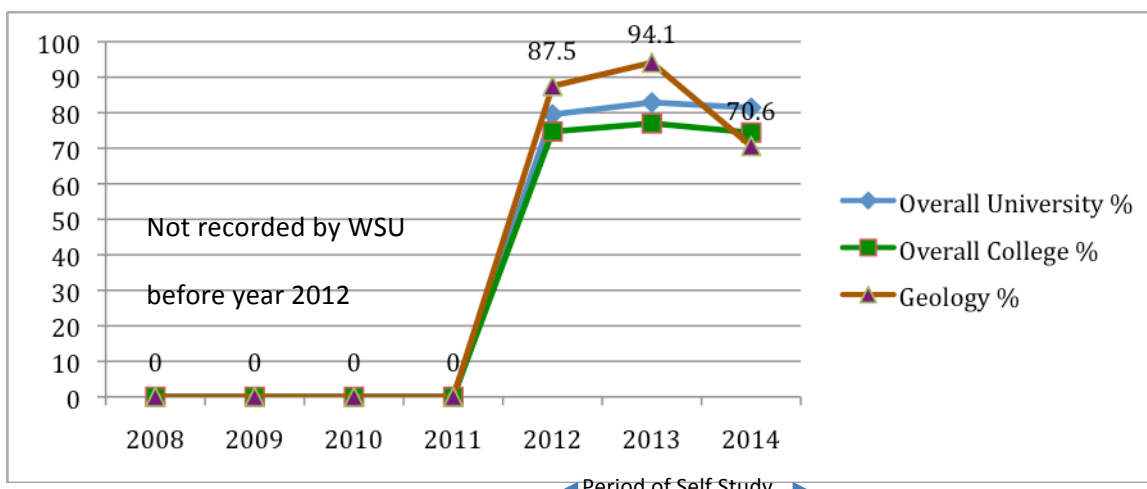
Learning Outcomes (most programs will have multiple outcomes)	Assessment Tool (e.g., portfolios, rubrics, exams)	Target/Criteria (desired program level achievement)	Results	Analysis
Students in the EEPS MS program will demonstrate knowledge in basic concepts in physical environments and earth resources	Option 1: Result on final exam in GEOL 650: Hydrogeology	Target is a 90% passing assignment; minimum 70% passing exam	2012: not recorded; new assessment structure	NA
			2013: see results from option 2	See below
			2014: see results from option 2	See below
	Option 2: Written report in E EPS 721: Current Issues in Global Env. Science	Target is a 90% passing assignment; minimum 70% passing assignment	2012: not recorded; new assessment structure	NA
			2013: 80% passed project n = 5	Minimum target met; no course content to be modified.
			2014: 87.5% passed; n=8	Target surpassed; One student in class of 8 failed to submit assignment
Students in the EEPS MS program will review multidisciplinary scientific techniques associated with global issues that enable them to demonstrate understanding of Earth's physical environments and resource problems at different spatial and temporal scales.	Option 1: Written report in EEPS 710: Great Discoveries and Controversies in Science	Target is a 90% passing assignment; minimum 70% passing report	2012: not recorded; new assessment structure	NA
			2013: 100% passed project n = 4	Target surpassed; no course content to be modified.
			2014: 100% passed project; n=5	Target surpassed; no course content to be modified.
	Option 2: Written report in EEPS 721: Current Issues in Global Env.	Target is a 90% passing assignment; minimum 70% passing assignment	2012: not recorded; new assessment structure	NA
			2013: see results from option 1	See below
			2014: 87.5% passed, n=8	Target surpassed;

	Option 2: Written	Target is a 90% passing	2012: not recorded; new assessment structure	NA
			2013: see results from option 1	See below
			2014: 87.5% passed, n=8	Target surpassed; One student in class of 8 failed to submit assignment
Students in the EEPS MS program will be able to design and analyze lab and field experiments in geosciences and physical sciences	Option 1: Lab project in GEOL 720: Geochemistry	Target is a 90% passing assignment; minimum 70% passing assignment	2012: No results; new assessment structure	NA
			2013: see results from option 2	See below
			2014: see results from option 2	See below
	Option 2: Result on class project in GEOL 698: Independent Study in	Target is a 90% passing assignment; minimum 70% passing assignment	2012: No results; new assessment structure	NA
			2013: 100% passed project n = 4	Target surpassed; no course content to

d. Provide aggregate data on student majors satisfaction (e.g., exit surveys), capstone results, licensing or certification examination results (if applicable), employer surveys or other such data that indicate student satisfaction with the program and whether students are learning the curriculum (for learner outcomes, data should relate to the outcomes of the program as listed in 3c).

Evaluate table 10 from the Office of Planning and Analysis regarding student satisfaction data.

AVERAGE STUDENT SATISFACTION WITH PROGRAM



For the first two years that the student satisfaction survey was run by the university, the Geology undergraduate program (87.5% and 94.1%) ranked well above the average of both the university and LAS. In 2014, student satisfaction dropped to just below the college average for satisfaction. The department attributes this to two factors. One is the effect of 50% reduction of tenured faculty from 2013 to 2014. This loss resulted in increased course loads and administrative duties for the remaining faculty and a reduction in time for student mentorship and advising. The student perception of the program may have also slipped due to reduction in employment opportunities in the petroleum sector related to drop in oil prices during the 2014 year.

e. Provide aggregate data on how the goals of the *WSU General Education Program* and *KBOR 2020 Foundation Skills* are assessed in undergraduate programs (optional for graduate programs).

Outcomes:	Results	
	Majors	Non-Majors
<ul style="list-style-type: none"> ○ Have acquired knowledge in the arts, humanities, and natural and social sciences ○ Think critically and independently ○ Write and speak effectively ○ Employ analytical reasoning and problem solving techniques 		
Geol 300 Energy, Resources and the Environment. Goal of 70% passing. 1) thinking critically and independently 2) analytical reasoning and problem solving techniques through field work, lab experiments and examination of theoretical knowledge		2012: n=159; 90% passed 2013: n=160; 91% passed 2014: n=133; 92% passed
Geol 526 Sedimentology: required of all undergraduate majors. Goal of 70% passing. Addresses: 1) thinking critically and independently 2) analytical reasoning and problem solving techniques through field work, lab experiments and examination of theoretical knowledge	2012: n=19; 95% passed 2013: n=20; 100% passed 2014: n=21; 100% passed	

Note: Not all programs evaluate every goal/skill. Programs may choose to use assessment rubrics for this purpose. Sample forms available at: <http://www.aacu.org/value/rubrics/>

f. For programs/departments with concurrent enrollment courses (per KBOR policy), provide the assessment of such courses over the last three years (disaggregated by each year) that assures grading standards (e.g., papers, portfolios, quizzes, labs, etc.) course management, instructional delivery, and content meet or exceed those in regular on-campus sections.

Provide information here:

* NA; Program does not participate in concurrent enrollment courses.

g. Indicate whether the program is accredited by a specialty accrediting body including the next review date and concerns from the last review.

Provide information here:

* NA; Program not accredited by a specialty body

h. Provide the process the department uses to assure assignment of credit hours (per WSU policy 2.18) to all courses has been reviewed over the last three years.

Provide information here:

The department faculty meet to review the assignment of credit hours and discuss any changes to be made before curriculum changes are sent to be reviewed by the College Curriculum Committee.

- i. Provide a brief assessment of the overall quality of the academic program using the data from 3a – 3e and other information you may collect, including outstanding student work (e.g., outstanding scholarship, inductions into honor organizations, publications, special awards, academic scholarships, student recruitment and retention).

Provide assessment here:

The Geology BS program offers a comprehensive curriculum, which is evidenced by results from its regular course offerings, its capstone field course and course evaluations. Quality of students admitted to the program has remained high over this reporting period. In the past five years, our undergraduate students have had consistently higher ACT scores than the average score for university students (see table 3a). The undergraduate and graduate programs as run through the Geology Department provide a rigorous and challenging program for students. Students at both the undergraduate and graduate level are often involved in faculty research and frequently make presentations at regional and national meetings with their faculty advisors.

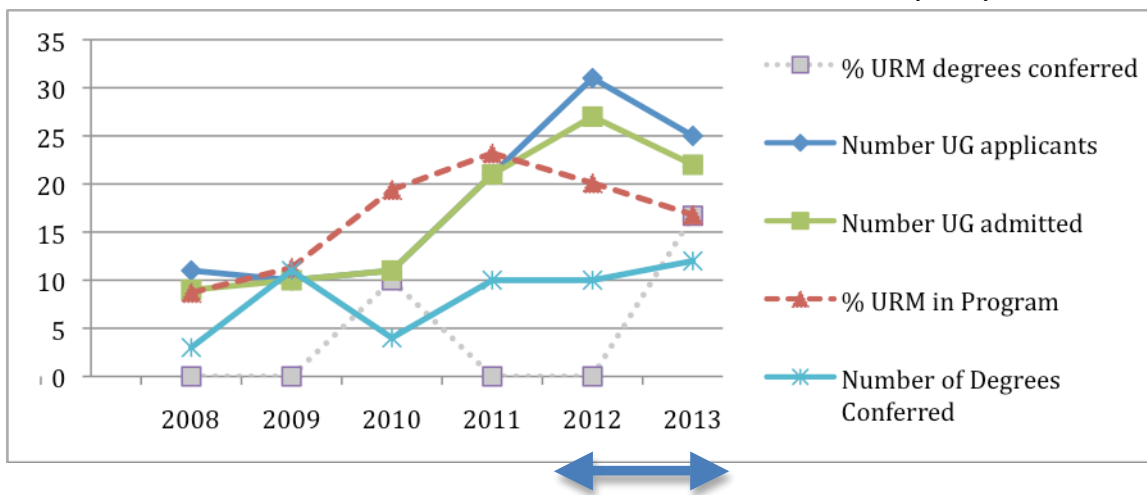
This self-review period represents the first period that student satisfaction was surveyed. In the two years that the student satisfaction survey was run, the Geology undergraduate program (87.5% and 94.1%) ranked well above the average of both the university and LAS. In 2014, student satisfaction dropped to just below the college average for satisfaction. The program has had strong alumni support through the years and maintains the second-highest graduate and undergraduate scholarship support in the College of Liberal Arts and Sciences (2014 total scholarship funds awarded was over \$30,000).

Since its inception in 2006, the EEPS program has developed a successful curriculum, cultivated a more diverse student population, and graduated trained geoscientists. Recognition of the importance of this program to the local environmental community was recently demonstrated by the new *June Allen Fellowship* to support graduate environmental research. The EEPS master program assesses training in inter- and multidisciplinary scientific concepts, expectations and techniques associated with relevant global environmental issues. Research projects will be defined and evaluated in the required EEPS 702 research methods course.

4. Analyze the student need and employer demand for the program. Complete for each program if appropriate (refer to instructions in the WSU Program Review document for more information on completing this section).

- a. Evaluate tables 11-15 from the Office of Planning Analysis for number of applicants, admits, and enrollments and percent URM students by student level and degrees conferred.

UNDERGRADUATE APPLICATIONS AND UNDER-REPRESENTED MINORITIES (URM) IN PROGRAM



The number of undergraduate applicants to the geology program has remained historically high during the review period. This is in part related to the student perception of career opportunities in the oil and gas profession as the price of petroleum rose. This is also reflected in the growth estimate for the geosciences from the Bureau of Labor Statistic (see table 4b below). Under-represented minorities were also attracted to the geology program during the review period, raising the percentage of URM in the program to between 17% and 23% from 2011 to 2013. Minority ethnicities included Black, Hispanic, Native American, and multi-race. No data were recorded by university for the EEPS MS program.

- b. Utilize the table below to provide data that demonstrates student need and demand for the program.

Employment of Majors*							
	Average Salary	Employment % In state	Employment % in the field	Employment: % related to the field	Employment: % outside the field	No. pursuing graduate or professional education	Projected growth from BLS** Current year only.
2012*	\$73,333	33%	100%	0%	0%	>5	18%
2013*	\$77,777	78%	88%	0%	12%	>7	21.2%
2014*	\$71,111	66%	100%	0%	0%	>7	16% (faster than average)

* N=3 for 2012 (33% response), N=9 for 2013 (75% response), N=9 for 2014 (50% response)

- Provide a brief assessment of student need and demand using the data from tables 11-15 from the Office of Planning and Analysis and from the table above. Include the most common types of positions, in terms of employment graduates can expect to find.

Provide assessment here:

The Geology department developed an internal survey of recent graduates (2012-2014) to examine student need and employer demand. During this self-review period, the university did not collect enough data for geology to survey recent graduates (David Wright, per comm). The department asked recent graduates questions related to salary range, employment location, job relevance to the geosciences and information on continuing and higher education. We received a 50% or higher response rate from 2013 and 2014 alumni (9 of 12 and 9 of 18 respectively) and a 33% response rate from 2012 alumni (3 of 10). Further information regarding additional education was supplemented with faculty knowledge and communication with alumni. Overall, our alumni, now employed, who graduated during the self-review period, have an average salary of \$74,000. Those with a bachelor's degree from our program have an average salary of \$73,333, and those with a MS degree from our EEPS program have an average salary of \$88,571. The majority of our graduates have entered the petroleum exploration/production or environmental remediation fields. Of those respondents from the classes of 2012-14, 11 are now employed as geoscientists in the petroleum industry, and 7 in environmental companies and government regulatory agencies. On average, 68% of our recent alumni are employed in the state of Kansas and 32% are employed out of state. Recent graduates employed outside the state are found in Texas (4 reporting), Colorado (3 reporting), Pennsylvania (1 reporting), and North Dakota (1 reporting).

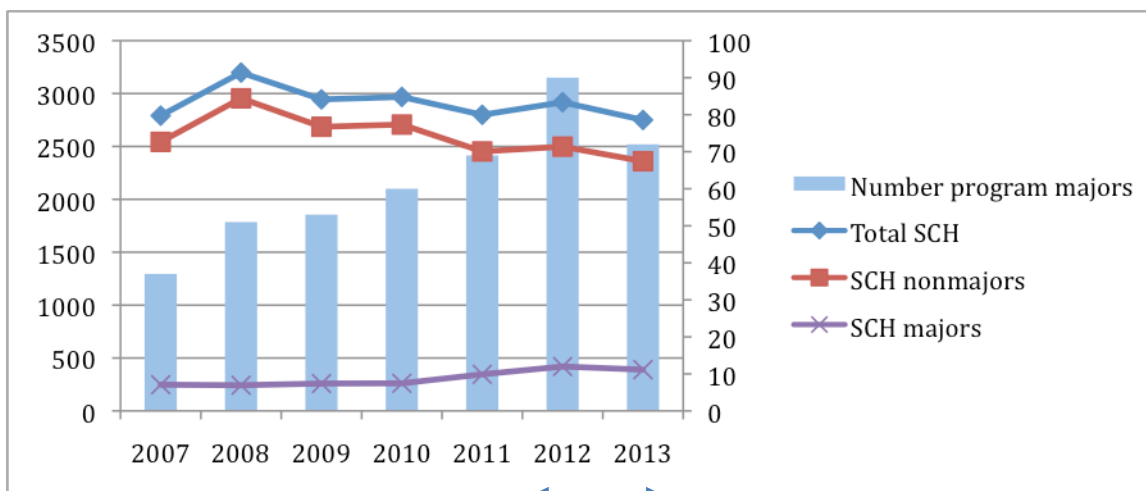
Our undergraduate alumni also indicated that they pursued graduate geoscience education primarily because they were interested in advancing within their companies and increasing salary. The department continues to provide graduate education to many of our undergraduate alumni. In recent years, some of our graduates have also matriculated at University of Kansas, Oklahoma State, University of Missouri – Rolla and Fort Hays State for graduate studies in particular areas of the geosciences and petroleum engineering.

5. **Analyze the service the Program provides to the discipline, other programs at the University, and beyond. Complete for each program if appropriate (refer to instructions in the WSU Program Review document for more information on completing this section).**

Evaluate table 16 from the Office of Planning Analysis for SCH by student department affiliation on fall census day.

- a. Provide a brief assessment of the service the Program provides. Comment on percentage of SCH taken by majors and non-majors, nature of Program in terms of the service it provides to other University programs, faculty service to the institution, and beyond.

Provide assessment here:



Over the review period, the department has produced between 2,750 and 2,918 SCH each fall semester. These numbers are slightly lower than previous years when the department had more faculty to teach majors and survey courses. With the addition of two new faculty at a full teaching load, we expect the numbers to stabilize and rise to 2010 levels.

The department expends much of its resources towards teaching non-majors in multiple sections of large General Education courses (including GEOL 102, 111, 235, 300, 302, 310, and 312). All tenured and tenure-track faculty teach these general education courses. The remainder of faculty time is devoted to upper level undergraduate and graduate teaching, continuing research and advising and other services to the university. Faculty service to the university has included various college and university committees including tenure and promotion, grievance, college curriculum, faculty senate and college council. Each faculty member also serves on about four thesis and dissertation committees in other programs each year (recent disciplines have included Biology, Chemistry, Anthropology, and Communication).

6. Report on the Program's goal (s) from the last review. List the goal (s), data that may have been collected to support the goal, and the outcome. Complete for each program if appropriate (refer to instructions in the WSU Program Review document for more information on completing this section).

In 2012, the Geology Department set three goals for both its undergraduate and graduate programs. The department's goals were to:

- Successfully recruit 15 new majors at the freshman and sophomore level each year
- Maintain the number of juniors and seniors at greater than 25 each year
- Maintain the number of graduates at greater than 10 each year

The department exceeded all goals for the review period. During this period, the department lost two faculty members but ended with five tenure-eligible faculty, placing it above the KBOR minima.

The EEPS MS program has met or exceeded KBOR minima for the number of faculty (11 geology and physics) and number of enrolled students. The EEPS MS program has not consistently met the minimum graduation number.

The department's goals for the EEPS MS program in the next review period are to:

- Successfully recruit 10 new students to the program each year
- Maintain a minimum of 20 majors in the program each year
- Graduate a minimum of 5 each year

*The Department of Geology establishes the tools to measure and determine if program objectives are being met. The tools and timeline for assessment of the BS program and EEPS MS objectives are presented in **Appendix 1**.*

7. Summary and Recommendations

- a. Set forth a summary of the report including an overview evaluating the strengths and concerns. List recommendations for improvement of each Program (for departments with multiple programs) that have resulted from this report (relate recommendations back to information provided in any of the categories and to the goals and objectives of the program as listed in 1e). Identify three year goal (s) for the Program to be accomplished in time for the next review.

Provide assessment here:

Geology BS and EEPS Programs Strengths:

1. High-quality graduates. Our graduates have been in high demand from petroleum and environmental industry, federal and state government agencies, and universities offering advanced degrees. Our students are highly competitive in academics.
2. Strong faculty. The faculty and staff of our program are close-knit, unified, and cooperative with each other in teaching, research, and departmental affairs in both good and bad times. This establishes the essential and solid

foundation for programs and contributes to the productivity of faculty. In addition it creates a positive culture that attracts students and fosters learning.

3. Comprehensive and focused curriculum. In addition to the standard geology core curriculum, we offer elective courses that cover a wide variety of topics in geological, atmospheric, oceanographic, geophysical, space, natural resources, and environmental sciences not only for geology majors, but for non-major science and non-science majors. International and global learning is a special strength of our program, in comparison with many other bigger programs in the nation. As a result, many employers and universities prefer our graduates. All of our faculty and staff have been vital in many campus, state and international activities, and have done so in various ways, such as volunteering in the WSU Green Group, state and national Science Olympiads, the Kansas Academy of Science, Exploration Place, regional journal editorships, and national and international lectureships. In the modern world of environmental and climatic crises, our curriculum provides the much-needed core scientific information and knowledge for future activists and leaders. Our faculty has participated in the Honor's Program. The department offers the required course (GEOL 102: Earth Science and the Environment) for future earth-science secondary teachers.

4. Extraordinary alumni support. Financial, equipment, and employment support from our alumni and friends to our programs are extremely strong. We have the second largest scholarship funds among all programs in LAS (recently over \$30,000 each year). Professional geologists from independent and major corporations teach lower and upper-division courses, providing much-needed applied learning and further strengthening our ties to the Wichita and national geoscience community.

5. Collaboration with LAS, university, state, national, and international universities and institutions. Collaborations with Chemistry, Biology, Philosophy, Communication, Mathematics, and Anthropology on campus, Texas A&M University, University of Alabama, South Methodist University, University of New Mexico, Boise State University, UNLV, University of Wisconsin-Oshkosh, Oklahoma State University, US Geological Survey, University of Oklahoma, and University of Kansas, greatly enhance the research and teaching and student recruitment of our programs. As a result, the faculty has achieved external grant awards and gifts exceeding \$1 million from organizations such as the American Chemical Society, Lattner Foundation, Department of the Interior (USGS), and IHS Kingdom Suite. Given their teaching load and service commitments, the faculty has produced a strong number of publications (see Table 2a).

Geology BS and EEPS Program Concerns:

1. Shortage of full-time faculty. Until 2014, faculty departures and a rise in undergraduate and graduate enrollment were overloading our faculty FTE (see Tables 2a-2d). As a result, we added part-time instructors and graduate teaching assistants to teach some important courses. With the addition of two faculty in Fall 2014, we hope that faculty FTE will stabilize and research and graduate advising will increase.
2. Lack of support staff. We have to resort to faculty and graduate student volunteers to maintain our lab equipment, departmental field vehicles, and departmental computer lab. All the volunteers have so far done a wonderful job. Nevertheless, inefficient usage and reduced maintenance have caused inefficiency in student and faculty research, as well as teaching.
3. Cyclic nature of the petroleum industry. Historically, the petroleum industry has been the largest employer of geology graduates across the nation. This industry is tied to the cyclic nature of the price of oil and natural gas. Thus, student enrollment and graduation numbers will certainly fluctuate due to the cyclic changes of the

petroleum industry activities. The drop in oil prices in fall of 2014 may mean reduction in both undergraduate and graduate majors interested in the petroleum field. We hope to offset this by advertising the employment opportunities in the groundwater remediation and hydrogeology fields.

4. Non-traditional student base and graduation rates. In an urban setting, many WSU students, including geology students, have work, family, and financial obligations, in addition to their coursework. Although we work with students to create a program of study that fits their needs, external commitments prohibits many of them from completing their degrees in a traditional 4-year pattern (undergraduate) or 2-year pattern (graduate) that may be implied by KBOR graduation standards. In addition, we strongly encourage both Geology undergraduates and EEPS graduate students to gain real-world experience through internships or traditional employment while enrolled. While this is essential to their later career success, it often slows their progress through the degree programs.

Undergraduate and EEPS Opportunities/Improvements:

1. Growth of environmental geosciences. The geology faculty has recognized the increased interests and job opportunities in environmental sciences at the state, national, and international levels. With our new faculty hire in the area of hydrogeology, the department plans to build on current curriculum to enhance the environmental sciences areas of the program. By strengthening the environmental geoscience aspects of the program, we will better sustain program majors during 'dry' periods of cyclical petroleum industry hiring.

2. Increasing research productivity. Recently acquired equipment, including an X-ray diffractometer (XRD), petrographic microscopes, and new classroom and research computers will allow us to enhance undergraduate and graduate research. Addition of new faculty bodes well for improving overall research productivity.

4. Continue increasing student enrollment and graduation rates. The petroleum industry has long been the main employment source for graduates of both the undergraduate and graduate programs. Petroleum activities in the state and worldwide will attract future students. Furthermore, the increased awareness of the general public on environmental pollution, alternative energy, and climatic changes is raising student interests in earth and environmental sciences. The local petroleum industry and local geology foundations (such as the Kansas Geology Foundation) have provided financial, data, and equipment support for our students and faculty for several decades, helping students graduate more quickly. In addition to scholarship funds, these institutions have given funds towards purchase of lab equipment (microscopes, XRD), funds for student travel and research, and geologic data for student research projects.

Undergraduate Geology BS goals

The Geology BS program has exceeded or met KBOR minima for number of J/S level majors. For all three years in review, the BS program met or exceeded the minimum for students graduated. The department has replaced faculty losses during the review period, bringing the faculty numbers above the KBOR minima.

The department's goals for the BS program are to maintain the goals from the previous review period, which include:

- Successfully recruit 15 new majors at the freshman and sophomore level each year
- Maintain the number of juniors and seniors at greater than 25 each year
- Maintain the number of graduates at greater than 10 each year

Graduate EEPS MS goals

The EEPS MS program (a joint program between Geology and Physics programs) has met or exceeded KBOR minima for the number of faculty (13 geology and physics faculty combined) and number of enrolled students. The Geology Department faculty sustains the program by teaching the EEPS courses and advising the majority of students. The EEPS MS program has not consistently met the minimum graduation number.

The department maintains as its goal for the EEPS MS program in the next review period to:

- Successfully recruit 10 new students to the program each year
- Maintain a minimum of 20 majors in the program each year
- Graduate a minimum of 5 each year

APPENDIX I

**"Tools to Measure Program Objectives"
GEOLOGY BS AND EEPS MS PROGRAMS**

Department of Geology

Goal 1: The Geology BS and EEPS MS programs seek to prepare individuals for employment in geologic careers in industry, government or academia.

Program Objective	Assessment Data Analyzed	Outcome 2012	Outcome 2013	Outcome 2014
1.1 The program will ensure a high quality curriculum which remains current and relevant to industry, government and academia.	The program will conduct annual review of: -IDEA evaluations -Current occupational trends	Reviewed February 2012: all faculty meeting goals for year; occupational trends are +18% for geosciences; reviewed mission statement to meet new KBOR requirements	Reviewed February 2013: all faculty meeting goals for year; occupational trends are +21.2% for geosciences; reviewed mission statement to meet new KBOR requirements	Reviewed February 2014 all faculty meeting goals for year; occupational trends are +16% for geosciences; reviewed mission statement to meet new KBOR requirements
	-Mission statement review			
1.2 The program will maintain a minimum of 25 students	The program will monitor results of recruitment activities -monitor outreach to local schools and community colleges -review recruitment media and material for introductory courses -review of brochures and information about department	Reviewed September 2012: department continues outreach to local students through school visits and tours of department; new department brochures being developed; confirmed enrolled students are confirmed majors or appropriately 90 enrolled	Reviewed September 2013: outreach to local students through school visits and tours of department; department brochures reviewed; confirmed enrolled students are confirmed majors or appropriately enrolled (total of 72 UG majors)	Reviewed September 2014 department continues outreach schools and tours of department; confirmed enrolled students are confirmed majors or appropriately enrolled (total of 90 UG majors)
	-confirm enrolled students are confirmed majors			
1.3 The program will improve graduation rates and retention rates.	Review trend in majors': -enrollment -number of graduates -graduation rates -student failure rate in courses	Reviewed September 2012 (pre-20th day enrollment #'s): enrollment up for past three years; graduation rates holding steady	Reviewed September 2013 (pre-20th day enrollment #'s): enrollment slightly down, but still historically high; graduation rates gradually rising	Reviewed September 2014 (pre-20th day enrollment #'s): enrollment up for past three years; graduation rates continue to rise
	-review advising process			

Goal 2: The Geology BS and EEPS MS programs seeks to foster professional growth and commitment to lifelong learning for students and faculty

Program Objective	Assessment Method/Data Sources	Outcome 2012	Outcome 2013	Outcome 2014
2.1: The program will seek to hire and maintain a highly qualified faculty to teach and advise undergraduate students	Faculty records will be reviewed annually: -FAR -Disciplinary actions -Faculty attrition	Reviewed February 2012: all faculty meeting goals for year; no disciplinary action necessary; notified one faculty member (Mazzullo) retiring in Spring 2013	Reviewed February 2013: all faculty meeting goals for year; no disciplinary action necessary; making motions to replace two faculty	Reviewed February 2014: all faculty meeting goals for year; no disciplinary action necessary; searching for two new faculty for fall 2014; update fall: searches successful, two new faculty added
	-Faculty publications and grants			
2.2 The program will partner with University and broader community in order to promote continuing education for students, faculty and alumni	The program will monitor faculty participation in service activities. Students will be encouraged to attend off-campus professional and technical talks.	Faculty attended three professional meetings in 2011-12; students attended four professional meetings in 2011-12 (GSA, AAPG and AAPG Hedberg)	Faculty attended three professional meetings in 2012-13; students attended three professional meetings in 2012-13 (GSA, AAPG and AAPG Hedberg)	Faculty attended three professional meetings in 2013-14; students attended three professional meetings in 2012-13 (GSA, AAPG and AAPG Hedberg)

Goal 3: The Geology BS program seeks to support and encourage scholarly research in the geological sciences

The EEPS MS program will graduate students active in the development and utilization of our planet's resources with due concern

Program Objective	Assessment Method/Data Sources	Outcome 2012	Outcome 2013	Outcome 2014
3.1 The program will encourage student participation in professional conferences, including the WSU research forums	The program will assess student participation in research conferences. -Number of students participating in professional conferences	Four students attended professional meetings in 2011-12; three students presented at meetings; three students publishing abstracts from conferences; one student preparing manuscript for publication	Three students attended professional meetings in 2012-13; two students presented at meetings; one student published manuscript for publication	Three students attended professional meetings in 2013-14; one student presented at meetings; one student published manuscript for publication; drop in student conference participation due to reduced faculty numbers
	-Number of students publishing results from research			
3.2 The program will support faculty engagement in research	The program will assess faculty engagement in research activities: -number of faculty publications -number of faculty grants -number of conferences attended	Reviewed February 2012: Faculty produced 5 publications in 2011-12; 3 grants; 5 conference presentations	Reviewed February 2013: Faculty produced 4 publications in 2012-13; 1 grant; 3 conference presentations	Reviewed February 2014: Faculty produced 4 publications in 2013-14; 1 grant; 3 conference presentations

Goal 4: The Geology BS program will ensure efficient and effective program operations consistent with the college, University and the profession.

Program Objective	Assessment Method/Data Sources	Outcome 2012	Outcome 2013	Outcome 2014
4.1 The program will develop and maintain student, faculty and program policies consistent with the standards of the college, University and profession.	The program will review: -program curriculum -management of faculty records -fair practices policies -undergraduate catalog edit review	none as this is a new department requirement	Faculty reviewed program curriculum, management of faculty records and policies in February 2013. No changes deemed necessary.	Faculty reviewed program curriculum, management of faculty records and policies in February 2014. No changes deemed necessary.
4.2 The program will maintain program operations to ensure program effectiveness and efficiency	The Geology BS program will assess personnel, financial and physical resources annually	department is meeting its financial obligations	Department is meeting its financial obligations	Department is meeting its financial obligations