



REVISION 09/2012

Program Review Self-Study Template

Academic unit: Geology

College: LAS

Date of last review 2007

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. Collette Burke _____

Dr. John Gries _____

Dr. Salvatore Mazzullo _____

Dr. William Parcell _____

Geology (BS) Submitted by: _____ Date _____

EEPS (MS) Submitted by: _____ Date _____
(name and title)

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:

Wichita State University is committed to providing comprehensive educational opportunities in an urban setting. Through teaching, scholarship and public service the University seeks to equip both students and the larger community with the educational and cultural tools they need to thrive in a complex world, and to achieve both individual responsibility in their own lives and effective citizenship in the local, national and global community.

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

There is no need to change at this time.

- e. Provide an overall description of your program (s) including a list of the measurable goals and objectives of the program (s) (both programmatic and learner centered).

Have they changed since the last review? Yes No

If yes, describe the changes in a concise manner.

Undergraduate BS Geology Program Description

The Department's BS in Geology program is based on a traditional geoscience education structure. 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 field geology courses. This will be addressed further in section 3c (Identify principle learner outcomes).

Masters EEPS Program Description

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 (Identify principle learner outcomes).

2a. 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 productivity (refer to instructions in the WSU Program Review document for more information on completing this section). Complete a separate table for each program if appropriate.

UG Program - BS (SCH from entire department)

Last 3 Years	Tenure/Tenure Track Faculty (Number)	Tenure/Tenure Track Faculty with Terminal Degree (Number)	Instructional FTE (#):			Total SCH - Total SCH by FY from Su, Fl, Sp	Total Majors - From fall semester	Total Grads – by FY									
			TTF= Tenure/Tenure Track	GTA=Grad teaching assist	O=Other instructional FTE												
			TTF	GTA	O												
Year 1 →	5	5	5	2.5	3.3	6700	28	11									
Year 2 →	5	5	5	2.0	2.7	6565	35	4									
Year 3 →	4	4	4	2.5	3.0	6633	36	10									
Total Number Instructional (FTE) = TTF+GTA+O						SCH/ FTE	Majors/ FTE	Grads/ FTE									
Year 1 →						10.8	620	3	1								
Year 2 →						9.7	677	4	0.4								
Year 3 →						9.5	698	4	1								
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	10		12		12											1	
Year 2	5		4		4											2	
Year 3	3		14		14											2	\$2.4mln

* Winning by competitive audition. **Professional attainment (e.g., commercial recording). ***Principal role in a performance. ****Commissioned or included in a collection. KBOR data minima for UG programs: Majors=25; Graduates=10; Faculty=3; KBOR data minima for master programs: Majors=20; Graduates=5; Faculty=3 additional; KBOR data minima for doctoral programs: Majors=5; Graduates=2; Faculty=2 additional.

- a. Provide a brief assessment of the quality of the faculty/staff using the data from the table above 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.

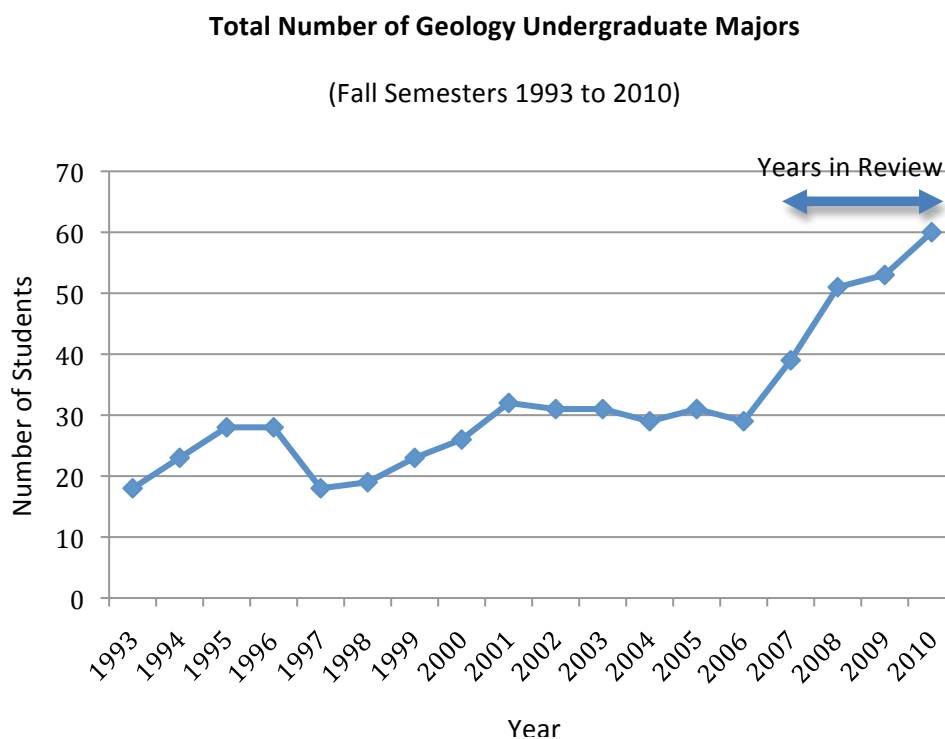
Provide assessment here:

The 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 objectives are presented in **Appendix !**.

As of spring 2012, the geology department is composed of four full-time professors (1 full and 3 associate professors) and two part-time instructors. Professor Mazzullo started phased

retirement in spring 2012 at 50% teaching, research and service. All professors hold doctoral degrees and department instructors hold either a doctorate or masters degrees.

In the 2009-10 academic year, the B.S. degree program was triggered for low numbers of J/S majors (average of 12.6 majors over five academic years) and graduates (average of 6.2 graduates over five fiscal years). Since this triggering, the department has taken steps to increase the number of majors and graduates and is pleased to report that the B.S. program is now meeting the KBOR minima for majors and degrees. The latest report indicates 36 J/S majors and 10 graduates. For perspective, a graph of the total number of geology majors since 1993 is plotted below. Note that the total number of majors in the program has increased from 37 students in 2007 to 60 in 2010.



Over the past three years, the total SCH per FTE has increased from 620 to 698 (see graph in section 5). The program has maintained the KBOR minimum for number of graduates for years 1 and 3 (11 and 10 respectively). FY 2010 graduation numbers were lower (4) due to the unexpected loss of one faculty member (Wan Yang) in 2010, which resulted in reduction of required course offerings necessary for graduation (GEOL 526 and GEOL 111). The timing of these course offerings were remedied and graduation numbers increased again in FY 2011.

While the department lost one faculty member in 2010, the BS program currently meets KBOR faculty minima for UG programs. We are replacing the faculty member with a hydrogeologist to expand into the environmental field. In addition, another faculty member (Bischoff) is returning full-time to the department after a long absence in an administrative role. In light of the small number of full-time research faculty maintaining the BS (n=4), their productivity remains high.

Faculty productivity in scholarly research is reflected by the number of publications, high quality of research and wide variety of multi-disciplinary collaborative research projects both domestically and internationally. For example, collaborative projects with geology, anthropology, and communication faculty at Wichita State, Texas A&M, University of Alabama, University of Kansas, Southern Methodist University, University of Wisconsin, Northwestern University (China), Oklahoma State University and the US Geological Survey. The faculty has expanded their research fields into geoinformatics (Parcell), environment and human health (Burke), and Mississippian karst reservoirs (Mazzullo). Our faculty regularly reviews journal articles and textbooks, as well as grant proposals. Three faculty members have been on editorial boards. Faculty frequently present their research results at regional, national and international conferences. Some have been invited to lead field trips, give lectures, workshops, and short courses to professional societies, research institutes, universities and industry.

2b. 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 productivity (refer to instructions in the WSU Program Review document for more information on completing this section). Complete a separate table for each program if appropriate.

Graduate program - MS

Last 3 Years	Tenure/Tenure Track Faculty (Number)		Tenure/Tenure Track Faculty with Terminal Degree (Number)		Instructional FTE (#): TTF= Tenure/Tenure Track GTA=Grad teaching assist O=Other instructional FTE			Total SCH - Total SCH by FY from Su, Fl, Sp	Total Majors - From fall semester	Total Grads - by FY							
					TTF	GTA	O										
Year 1 →	*		*		*	*	*	N/A	21	10							
Year 2 →	*		*		*	*	*	N/A	19	1							
Year 3 →	*		*		*	*	*	N/A	20	3							
Total Number Instructional (FTE) – TTF+GTA+O								SCH/ FTE	Majors/ FTE	Grads/ FTE							
Year 1 →								N/A	N/A	N/A	N/A						
Year 2 →								N/A	N/A	N/A	N/A						
Year 3 →								N/A	N/A	N/A	N/A						
Scholarly Productivity (Geology Faculty)	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	10		12		12											1	
Year 2	5		4		4											2	
Year 3	3		14		14											2	\$2.4mln

* Winning by competitive audition. **Professional attainment (e.g., commercial recording). ***Principal role in a performance. ****Commissioned or included in a collection. KBOR data minima for UG programs: Majors=25; Graduates=10; Faculty=3; KBOR data minima for master programs: Majors=20; Graduates=5; Faculty=3 additional; KBOR data minima for doctoral programs: Majors=5; Graduates=2; Faculty=2 additional.

*From the table on page 3, indicate number of faculty (and instructional FTE) teaching in the graduate program.

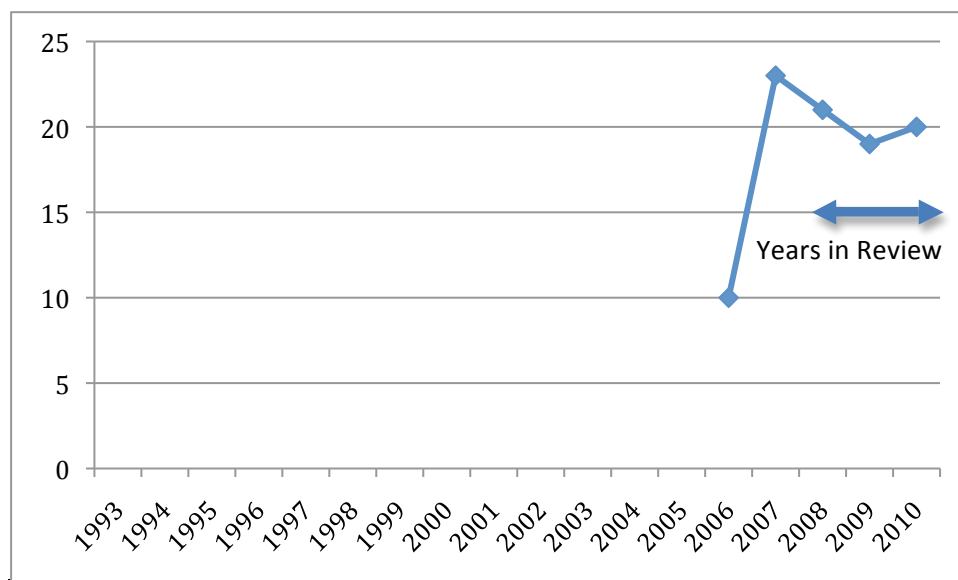
- a. Provide a brief assessment of the quality of the faculty/staff using the data from the table above as well as any additional relevant data. Programs should comment on details in regard to productivity of the faculty (i.e., some departments may have a few faculty producing the majority of the scholarship),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

Provide assessment here:

As laid out by the Graduate School guidelines, the Department of Geology establishes the tools to measure and determine if the MS program objectives are being met. The tools and timeline for assessment of program objectives are presented in **Appendix I**.

The EEPS MS program was instituted in the fall of 2006 and on average meets Regent's minimum requirements for number of majors during the years reviewed in this report. In the 2009-10 academic year, the EEPS degree program was triggered for low number of majors (11.6/5 yrs) and low number of graduates (2.8/5 yrs). The EEPS program is steadily making progress toward meeting and exceeding KBOR minima for graduate programs. Student numbers already exceed minima. For perspective, a graph of the total number of EEPS graduate majors since 2006 is plotted below. While the program began only in 2006, it has enrolled an average of 20 graduate students per year since 2007.

As new faculty are added to the program, graduation rates, student diversity and quality are expected to increase. For the last two years, the program's graduation numbers did not meet the KBOR standards. This is in part due to backlog of students related to the 2010 loss of a faculty member (Yang) in the Geology Department. The department will replace the faculty member with a hydrogeologist. In addition, another faculty member (Bischoff) is returning full-time to the department after a long absence in administrative role (Dean of LAS). During the review period, four geology faculty members participating in EEPS have shown high productivity for their level of teaching and service.



3. Academic Program: Analyze the quality of the program as assessed by its curriculum and impact on students. Complete this section 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.

Last 3 Years	Total Majors - From fall semester	ACT – Fall Semester (mean for those reporting)	
		Majors	All University Students - FT
Year 1 →	28	21.2	22.66
Year 2 →	35	23.4	22.72
Year 3 →	36	23.1	22.81

KBOR data minima for UG programs: ACT \leq 20 will trigger program.

- b. For graduate programs, compare graduate GPAs of the majors with University graduate GPAs.*

Last 3 Years	Total Admitted - By FY		Average GPA (Admitted) – Domestic Students Only (60 hr GPA for those with \geq 54 hr reported) By FY					
	MS	PhD			Comparisons			
			MS GPA	PhD GPA	College – MS	College – PhD	Univ - MS	Univ PhD
Year 1 →08	20	N/A	3.23	N/A	3.44	N/A	3.48	N/A
Year 2 →09	11		3.41		3.41		3.48	
Year 3 →10	16		3.18		3.32		3.48	

*If your admission process uses another GPA calculation, revise table to suit program needs and enter your internally collected data.

- 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. 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. In the following table provide program level information. You may add an appendix to provide more explanation/details. Definitions:

Learning Outcomes: Learning outcomes are statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire in their matriculation through the program (e.g., graduates will demonstrate advanced writing ability).

Assessment Tool: One or more tools to identify, collect, and prepare data to evaluate the achievement of learning outcomes (e.g., a writing project evaluated by a rubric).

Criterion/Target: Percentage of program students expected to achieve the desired outcome for demonstrating program effectiveness (e.g., 90% of the students will demonstrate satisfactory performance on a writing project).

Result: Actual achievement on each learning outcome measurement (e.g., 95%).

Analysis: Determines the extent to which learning outcomes are being achieved and leads to decisions and actions to improve the program. The analysis and evaluation should align with specific learning outcome and consider whether the measurement and/or criteria/target remain a valid indicator of the learning outcome as well as whether the learning outcomes need to be revised.

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.	Lab project in GEOL 324 "Petrology"	Target is a 90% passing assignments; minimum 70% passing assignments	No results as this is a new assessment structure	If target is not met, approach to content will be modified.
	Final exam in GEOL 570 "Biogeology"	Target is a 90% passing assignments; minimum 70% passing assignments	No results as this is a new assessment structure	If target is not met, approach to content will be modified.
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	No results as this is a new assessment structure	If target is not met, approach to content will be modified.

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	Result on final exam in GEOL 650: Hydrogeology	Target is a 90% passing assignment; minimum 70% passing exam	No results as this is a new assessment structure	If target is not met, approach to content will be modified.
	Written report in EEPS 721 "Current Issues in Global Env. Science	Target is a 90% passing assignment; minimum 70% passing 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.	Written report in EEPS 710: Great Discoveries and Controversies in Science	Target is a 90% passing assignment; minimum 70% passing report	No results as this is a new assessment structure	If target is not met, approach to content will be modified
	Written report in EEPS 721: Current Issues in Global Env. Science	Target is a 90% passing assignment; minimum 70% passing assignment		
Students in the EEPS MS program will be able to design and analyze lab and field experiments in geosciences and physical sciences	Lab project in GEOL 720: Geochemistry	Target is a 90% passing assignment; minimum 70% passing assignment	No results as this is a new assessment structure	If target is not met, approach to content will be modified
	Result on class project in GEOL 698: Independent Study in Geology	Target is a 90% passing assignment; minimum 70% passing assignment		

- d. Provide aggregate data on student majors satisfaction (e.g., exit surveys), capstone results, licensing or certification examination results, 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 goals and objectives of the program as listed in 1e).

Student Satisfaction (e.g., exit survey data on overall program satisfaction).* If available, report by year, for the last 3 years			Learner Outcomes (e.g., capstone, licensing/certification exam pass-rates) by year, for the last three years				
Year	N	Result (e.g., 4.5 on scale of 1-5, where 5 highest)	Year	N	Name of Exam	Program Result	National Comparison±
1		Not performed	1				
2		Not performed	2				
3		Not performed	3				

*Available for graduate programs from the Graduate School Exit Survey. Undergraduate programs should collect internally. ± If available.

- 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).

Goals/Skills Measurements of: -Oral and written communication -Numerical literacy -Critical thinking and problem solving -Collaboration and teamwork -Library research skills -Diversity and globalization	Results	
	Majors	Non-Majors
Not performed as this is a new requirement.		

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

Programs are not accredited by specialty regional or national body.

- g. Provide a brief assessment of the overall quality of the academic program using the data from 3a – 3f 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:

Geology BS program

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 been increasing over this reporting period. In the past two years, our undergraduate students have 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. For example, seven students coauthored presentation in 2011. Department faculty members are often nominated for Excellence in Teaching Award.

During the review period, the department BS program did not have an internal exit survey to assess student major satisfaction with the program. However, other evidence during the reporting period suggests that we are serving our students very well. The state licensure exam results (from the KS Board of Technical Professions) indicate that WSU geology graduates collectively performed better than either KU or KSU geology graduates (pers. comm. with KS state professional licensing board; privacy issues preclude full disclosure of results between schools). Over the years, our undergraduate and graduate programs have produced more professional geologists for the state of Kansas than all other Kansas universities combined. Consequently, the program has had strong alumni support, and maintains the second-highest graduate and undergraduate scholarship support in the College of Liberal Arts and Sciences (2012 total scholarship funds awarded was over \$30,000). In an effort to more systematically monitor the program's mission, data on KBOR and GenEd goals will be collected and reported on during the next reporting period.

EEPS MS Program

Since its inception in 2006, the EEPS program has developed a successful curriculum, cultivated a more diverse student population, and graduated trained geoscientists, all of whom acquired jobs in their field of emphasis. 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 will assess 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. To date, no formal assessment of student satisfaction with the EEPS program has been developed and the EEPS program is instituting a graduate student exit survey that will be posted on the Geology Department website.

4a. 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. Utilize the table below to provide data that demonstrates student need and demand for the program.

Undergraduate - BS

Majors										Employment of Majors*									
Last 3 FYs – Su, Fl, and Sp	No. new applicants or declared majors	No. who enter or are admitted in the major	No. enrolled one year later	1 Year Attrition %	Total no. of grads	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**							
Year 1 →					11			80%	10%		10%	Current year only							
Year 2 →					4			90%			10%	↓							
Year 3 →					10			80%	10%		10%	18%							
Race/Ethnicity by Major***										Race/Ethnicity by Graduate***									
	NRA	H	A I / A N	A	B	N H / PI	C	MR	UNK	NRA	H	A I / A N	A	B	N H / PI	C	MR	UNK	
Year 1 →	1	0	0	1	0	0	22	0	4	1	0	0	1	0	0	7	0	2	
Year 2 →	1	2	0	0	0	0	29	0	3	0	0	0	0	0	0	4	0	0	
Year 3 →	0	3	1	0	0	0	28	1	3	4	0	0	0	0	0	16	0	0	

* May not be collected every year

** Go to the U.S. Bureau of Labor Statistics Website: <http://www.bls.gov/oco/> and view job outlook data and salary information (if the Program has information available from professional associations or alumni surveys, enter that data)

*** NRA=Non-resident alien; H=Hispanic; AI/AN=American Indian/ Alaskan Native; A=Asian; B=Black; NH/PI=Native Hawaiian/Pacific Islander; C=Caucasian; MR=Multi-race; UNK=Unknown

KBOR data minima for UG programs: Majors=25; Graduates=10; Faculty=3; KBOR data minima for master programs: Majors=20; Graduates=5; Faculty=3 additional; KBOR data minima for doctoral programs: Majors=5; Graduates=2; Faculty=2 additional.

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

Provide assessment here:

According to the U.S. Bureau of Labor Statistics, “employment of geoscientists and hydrologists is expected to grow faster than the average for all occupations. Median annual wages of geoscientists were \$79,160 in May 2008. The middle 50 percent earned between \$54,470 and \$113,390; the lowest 10 percent earned less than \$41,700, and the highest 10 percent more than \$155,430.”

Such salary opportunities are attractive to prospective majors and faculty. Demand for geoscientists as been dramatically increasing in the past few years, in part due to the growth of petroleum and mining industries, but also due to an aging workforce. In 2011, the American Geosciences Institute (AGI) measured the first wholesale attrition of geoscience professionals due to retirements. This movement has begun in the federal geoscience workforce and is spreading to the environmental, oil/gas and mining industries. It has also begun in academia with retirements. Wichita State is also beginning to see this trend. This environment has created a strong geoscience job market and the next generation workforce is only about one-third the size of the retiring population. There are currently more about 250,000 geoscientists working in the United States today, but by 2021, there may be a deficit of 150,000. (source: Keane 2011; earthmagazine.org). As is common with most geoscience programs across the country, the ethnicity of our students is predominantly Caucasian. However, there has been a rise in Hispanic majors in the last two years of review.

4b. 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. Utilize the table below to provide data that demonstrates student need and demand for the program.

Graduate - MS

Majors						Employment of Majors*													
Last 3 FYs – Su, Fl, and Sp	No. new applicants or declared majors	No. who enter or are admitted in the major	No. enrolled one year later	1 Year Attrition %	Total no. of grads	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**							
Year 1→					10			90%	10%			Current year only							
Year 2→					1			100%				↓							
Year 3→					3			90%			10%	18%							
Race/Ethnicity by Major***										Race/Ethnicity by Graduate***									
	NRA	H	A I / A N	A	B	N H / PI	C	MR	UNK	NRA	H	A I / A N	A	B	N H / PI	C	MR	UNK	
Year 1→	5	0	0	1	0	0	14	0	1	3	0	0	0	0	0	7	0	0	
Year 2→	3	0	0	1	0	0	15	0	0	0	0	0	0	0	0	1	0	0	
Year 3→	4	0	0	0	0	0	16	0	0	1	0	0	1	0	0	1	0	0	

* May not be collected every year

** Go to the U.S. Bureau of Labor Statistics Website: <http://www.bls.gov/oco/> and view job outlook data and salary information (if the Program has information available from professional associations or alumni surveys, enter that data)

*** NRA=Non-resident alien; H=Hispanic; AI/AN=American Indian/ Alaskan Native; A=Asian; B=Black; NH/PI=Native Hawaiian/Pacific Islander; C=Caucasian; MR=Multi-race; UNK=Unknown

KBOR data minima for UG programs: Majors=25; Graduates=10; Faculty=3; KBOR data minima for master programs: Majors=20; Graduates=5; Faculty=3 additional; KBOR data minima for doctoral programs: Majors=5; Graduates=2; Faculty=2 additional.

Provide a brief assessment of student need and demand using the data from the table above. Include the most common types of positions, in terms of employment, graduates can expect to find. As is common with most geoscience programs across the country, the ethnicity of our students is predominantly Caucasian.

Provide assessment here:

See description for undergraduate program above; there is a similar demand for current students graduating from the EEPS masters program. MS graduation numbers have been lower in the last two years relating to two trends in the department. First, an increasing number of our students are taking on internships and part-time work with local energy companies as the price of oil has increased. While we certainly encourage our graduate students to gain 'real-world' experience and professional connections through such employment, the immediate affect is to slow their academic progress in the program. In addition, the unexpected loss of one faculty member in 2010 resulted in reduction of required course offerings necessary for graduation and one less research faculty member to advise graduate student research. The addition of instructors is remedying the regularity of required course offerings until such time that we successfully recruit a new research faculty member.

- 5. Analyze the cost of the program and 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).**

Percentage of SCH Taken By (last 3 years)			
Fall Semester	Year 1	Year 2	Year 3
UG Majors	7.3	8.6	8.4
Gr Majors	5.1	3.8	3.3
Non-Majors	87.6	87.5	88.3

- a. Provide a brief assessment of the cost and 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.

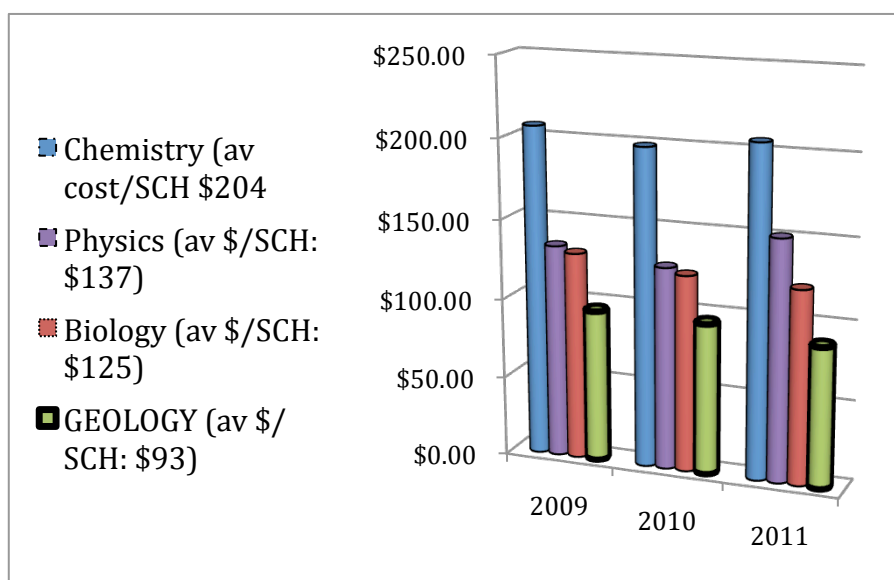
Provide assessment here:

While the Geology Department strives for productive and quality research, its four full-time faculty have contributed a significant amount of their time to producing a large quantity of credit hours for the university. The Geology Department provides an extremely good value to the university. The department's cost to the university per credit hour has consistently been far below the other sciences in LAS (see graph below). For example, in 2011, Geology's cost per SCH was \$93 as compared to the other sciences, which range from \$125 to \$206). For this, the department consistently produces high instructional SCH/FTE.

As the table 5 above indicates, the department expends much of its teaching resources towards non-majors in multiple sections of seven 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 along with research projects 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).

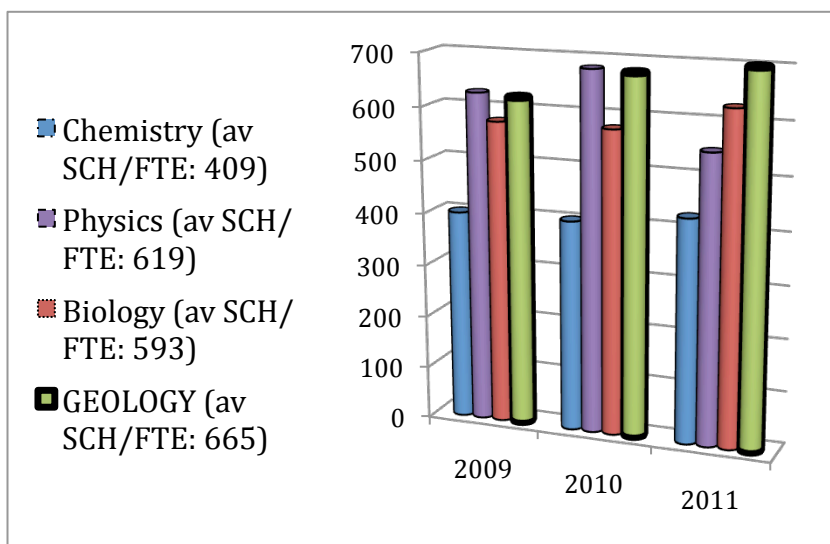
DEPARTMENT COST

per Credit Hour for LAS Science Departments



GEOLOGY INSTRUCTIONAL SCH / TOTAL FTE

versus Other LAS Science Departments



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).

Geology BS Program

(For Last 3 FYs)	Goal (s)	Assessment Data Analyzed	Outcome
BS Geology - Internal program review from spring 2010	Successfully recruit 15 new majors at freshman & sophomore level	FY 2010-2011	18 (exceeds goal)
	Maintain junior and seniors at greater than 25	FY 2010-2011	28 (exceeds goal)
	Maintain graduates at or above 10 per year	FY 2010-2011	10 (meets goal)

EEPS MS Program

(For Last 3 FYs)	Goal (s)	Assessment Data Analyzed	Outcome
EEPS MS - Internal program review from spring 2010	Successfully recruit 10 new students each year	FY 2010-2011	10 (meets goal)
	Maintain minimum of 20 majors each year	FY 2010-2011	20 (meets goal)
	Maintain graduates at or above 5 per year	FY 2010-2011	3 (does not meet goal)

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 undergraduate and graduate programs have produced more professional geologists to the state of Kansas than all other Kansas universities combined. 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 teach lower and upper-division courses, providing much-needed instructorship and further strengthening our ties with the Wichita community. Within this reporting period, local businesses donated the funds for the department to purchase 10 microscopes and a \$130,000 X-Ray Diffractometer, which are crucial to teaching and research.

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 \$2 million from the American Chemical Society, Kansas Health Foundation, Lattner Foundation, Department of the Interior, IHS Kingdom Suite, and submitted grant proposals to the National Science Foundation. Given their teaching load and service commitments, the faculty has produced a significant number of publications (see Table 2a), several of which have received national awards such as the 2010 AAPG Bulletin best paper.

Geology BS and EEPS Program Concerns:

1. Shortage of full-time faculty (as relates to 2a,b above). Unfilled faculty departures and a rise in undergraduate and graduate enrollment have overloaded our faculty in the last 5 years. As a

result, we have added part-time instructors and graduate teaching assistants to teach some important courses. Student and faculty research, as well as student recruitment, suffer from this shortage. For example, the department cannot meet the high demand for courses and research in environmental sciences and increased demand for core undergraduate and graduate courses at the level we would like.

2. Lack of ability to expand the program (as relates to 2a,b above). Our ability to meet the strong demand for geology and environmental sciences education has been hampered by our inability to expand our curriculum and research in this field.

3. Lack of support staff (as relates to 2a,b and 5 above). 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.

4. Cyclic nature of the petroleum industry (as relates to 4a above). 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.

5. Non-traditional student base and graduation rates (as relates to 4a above). 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. Addition of environmental sciences (as relates to 2a,b above). The geology faculty has recognized the increased interests and job opportunities in environmental sciences at the state, national, and international levels. With a new faculty hire in the area of hydrogeology, the department plans to make curriculum changes to enhance the environmental sciences areas of the program.

2. New faculty hires (as relates to 2a,b above). The expansion into environmental sciences will require replacing faculty who have left or retired from the department and the addition of new faculty hires within geology that emphasize environmental issues and increase opportunities for collaboration with other departments.

3. Increasing research productivity (as relates to 2a,b above). Recently acquired equipment, including an X-ray diffractometer (XRD), ~20 petrographic microscopes, and new computers and software for geologic analyses (in total exceeding \$2.4 million from external grants) will allow us to enhance undergraduate research. Addition of new faculty would also improve overall productivity.

4. Continue increasing student enrollment and graduation rates (as relates to 2a,b, 3d, and 4a,b above). The petroleum industry has long been the main employment source for graduates of both the undergraduate and graduate programs. High prices in oil and gas and increased 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 faculty and number of J/S level majors. For two out of the three years in review, the BS program met the minimum for students graduated.

The department's goals for the BS program in the next review period are 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

Graduate EEPS MS goals

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

APPENDIX I

"Tools to Measure Program Objectives"

PART 1e and 2a GEOLOGY BS PROGRAM

**Bachelor of Science
(Geology)**

Goal 1: The Geology BS program seeks to prepare individuals for employment in geologic careers in industry, government or academia.

Program Objective	Assessment Method/Data Sources	Dates for Evaluation	Responsibility	Results/Changes
1.1 The BS Geology program will ensure a high quality curriculum which remains current and relevant to industry, government and academia.	The program will conduct annual review of:		Dept Chair & Program Faculty	All faculty exceeding requirements of their academic position
	-IDEA evaluations	Annual (February)		
	-Current occupational trends	Annual (September)		
	-Mission statement review	Annual (September)		
1.2 The BS Geology program will maintain a minimum of 25 students	The program will monitor results of recruitment activities		Dept Chair & Program Faculty	none as this is a new department requirement
	-monitor outreach to local schools and community colleges	Annual (September)		
	-review recruitment media and material for introductory courses	Annual (September)		
	-review of brochures and information about department	Annual (September)		
	-confirm enrolled students are confirmed majors	Annual (September)		
1.3 The BS Geology program will improve graduation rates and retention rates.	Review trend in majors':		Dept Chair & Program Faculty	none as this is a new department requirement
	-enrollment	Annual (September)		
	-number of graduates	Annual (September)		
	-graduation rates	Annual (September)		
	-student failure rate in courses	Annual (September)		
	-review advising process	Annual (September)		

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

Program Objective	Assessment Method/Data Sources	Dates for Evaluation	Responsibility	Results/Changes
2.1: The Geology BS program will seek to hire and maintain a highly qualified faculty to teach and advise undergraduate students	Faculty records will be reviewed annually:		Dept Chair	All faculty exceeding requirements of their academic position
	-FAR	Annual (February)		
	-Disciplinary actions	Annual (February)		
	-Faculty attrition	Annual (February)		
	-Faculty publications and grants	Annual (February)		
2.2 The Geology BS 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.	Annual (February)	Dept Chair & Program Faculty	All faculty exceeding requirements of their academic position

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

Program Objective	Assessment Method/Data Sources	Dates for Evaluation	Responsibility	Results/Changes
3.1 The Geology BS program will encourage student participation in professional conferences, including the WSU undergraduate research forum	The program will assess student participation in research conferences.		Dept Chair & Program Faculty	none as this is a new department requirement
	-Number of students participating in professional conferences	ongoing		
	-Number of students publishing results from research	Annual (February)		
3.2 The Geology BS program will support faculty engagement in research	The program will assess faculty engagement in research		Dept Chair & Program Faculty	All faculty exceeding requirements of their academic position
	-number of faculty publications	Annual (February)		
	-number of faculty grants	Annual (February)		
	-number of conferences attended	Annual (February)		

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	Dates for Evaluation	Responsibility	Results/Changes
4.1 The Geology BS program will develop and maintain student, faculty and program policies consistent with the standards of the college, University and profession.	The program will review:		Dept Chair & Program Faculty	none as this is a new department requirement
	-program curriculum	Annual (February)		
	-management of faculty records	Annual (February)		
	-fair practices policies	Annual (February)		
	-undergraduate catalog edit review	Annual (February)		
4.2 The Geology BS program will maintain program operations to ensure program effectiveness and efficiency	The Geology BS program will assess personnel, financial and physical resources annually	Annual (May)	Dept Chair & Program Faculty	department is meeting its financial obligations and using its allotted funds wisely

APPENDIX I

"Tools to Measure Program Objectives"

PART 1e and 2b EEPS MS PROGRAM

Master of Science (EEPS)

Goal 1: The EEPS MS program prepares individuals for employment in environmental, geologic and physics careers in industry, government or academia

Program Objective	Tool/Assessment Method/Data Sources	Dates for Evaluation	Responsibility	Results/Changes
1.1 The EEPS MS program will ensure a high quality curriculum which remains current and relevant to industry, government and academia.	The program will conduct annual review of:		Graduate Coordinator, Dept Chairs, & Program Faculty	none as this is a new department requirement
	-Current occupational trends	Annual (September)		
	-Mission statement review	Annual (September)		
1.2 The EEPS MS program will maintain a minimum of 20 students	The program will monitor results of recruitment activities		Graduate Coordinator, Dept Chairs, & Program Faculty	none as this is a new department requirement
	-monitor outreach to local schools and community colleges	Annual (September)		
	-review recruitment media and material for introductory courses	Annual (September)		
	-review of brochures and information about department	Annual (September)		
	-confirm enrolled students are confirmed majors	Annual (September)		
1.3 The EEPS MS program will improve graduation rates and retention rates.	Review trend in majors':		Graduate Coordinator, Dept Chairs, & Program Faculty	none as this is a new department requirement
	-enrollment	Annual (September)		
	-number of graduates	Annual (September)		
	-graduation rates	Annual (September)		
	-student failure rate in courses	Annual (September)		
	-review advising process	Annual (September)		

Goal 2: The EEPS MS program remains committed to fostering professional growth and commitment to lifelong learning for students and faculty

Program Objective	Tool/Assessment Method/Data Sources	Dates for Evaluation	Responsibility	Results/Changes
2.1: The EEPS MS program will seek to hire and maintain a highly qualified faculty to teach and advise graduate students	Faculty records will be reviewed annually:		Dept Chairs	All faculty exceeding requirements of their academic position
	-FAR	Annual (February)		
	-Disciplinary actions	as needed		
	-Faculty attrition	as needed		
	-Faculty publications and grants	Annual (February)		
2.2 The EEPS MS 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.	Annual (February)	Dept Chairs	All faculty exceeding requirements of their
	Students will be encouraged to attend off-campus professional and technical talks.	ongoing through through year	Graduate Coordinator, Dept Chairs, & Program Faculty	ongoing

Goal 3: The EEPS MS program will • Support and encourage independent scholarship and develop competence in research in the physical and environmental sciences

Program Objective	Tool/Assessment Method/Data Sources	Dates for Evaluation	Responsibility	Results/Changes
3.1 The EEPS MS program will encourage student participation in professional conferences, including the WSU graduate research forum (GRASP)	The program will assess student participation in research conferences.		Graduate Coordinator, Dept Chairs, & Program Faculty	none as this is a new department requirement
	-Number of students participating in professional conferences	Annual (February)		
3.2 The EEPS MS program will support faculty engagement in research	-Number of students publishing results from research	Annual (February)	Dept Chairs	All faculty exceeding requirements of their academic position
	The program will assess faculty engagement in research activities:			
	-number of faculty publications	Annual (February)		
	-number of faculty grants	Annual (February)		
	-number of conferences attended	Annual (February)		