PALO VERDE COLLEGE

Program Review

Geosciences

Presented by Philip Clinton

2011-2012

The Geosciences discipline provides lower division general education transferable and nontransferable courses, as well as preparation for occupational certificate programs. The Discipline provides students an opportunity to study human cultures, persons (past and present), social behavior, investigate the internal and external processes of Earth, and the natural relationships between geologic processes, natural resources, and the needs of society.

EXECUTIVE SUMMARY

Geosciences

1. **Program Strengths:**

    a. Discipline faculty willingness to implement new teaching methodologies and techniques, including online instruction and Bridge delivery, adoption of open source texts, and implementation of scoring rubric to track student learning.

    b. Discipline faculty conducting Flex Day training, working with outside agencies such as the National Park Service and solar programs, and working with four-year institutions that offer degrees and majors (e.g., Environmental Studies at UC Riverside/CSU Fresno), for which PVC's geosciences program is suitable preparation

    c. Discipline faculty commitment to tracking student learning outcomes and implementing improvements to improve continuously student learning.

    d. The Program Committee commends faculty for efforts to develop a program in Geographic Information Systems. While the program was unsuccessful in attracting sufficient students to make it feasible, we applaud the effort to develop new program ideas.

2. **Program Weaknesses:**

    Program faculty has indicated the need for tutoring services available to geosciences students.

3. **Recommendations for Program Improvement:**

    a. Continue ongoing efforts to monitor student learning and adopt innovative teaching methodologies.

    b. Continue efforts in program and course learning assessment.

4. **Committee Determination:**

    Report is accepted and may proceed to the next step in the process.

Program Review Committee Approval Date: April 17, 2012

PROGRAM REVIEW:
GEOSCIENCES
2012

PART I: SUPPORT OF THE COLLEGE MISSION

STATE THE PURPOSE OF THIS PROGRAM.

The Geosciences discipline is comprehensive in that is provides a variety of science courses that address the diverse educational needs of the community. Almost all course offered by the Discipline satisfy general education requirements for associate degrees and transfer to four-year institutions. These courses emphasize the development of student critical thinking skills that contribute to academic and vocational success and impart a basic understanding of the sciences.

DESCRIBE HOW THE PROGRAM SUPPORTS THE OVERALL MISSION OF THE COLLEGE AS ADOPTED BY THE BOARD OF TRUSTEES.

The Geosciences discipline provides an excellent learning environment through teaching, field trips and in-the-field activities, all designed to give students the tools for success through on the job, practical, hands-on experiences. This discipline promotes scientific inquiry, environmental awareness, synthesis of interrelated disciplines, and lifelong learning through lecture and laboratory courses for those pursuing degrees within and outside of the physical sciences. In addition, this discipline promotes community development through the offering of certificates for those who want to enter a profession utilizing Geographic Information Systems.

DESCRIBE THE UNIQUE INSTITUTIONAL GOAL THE PROGRAM SERVES.

The Geosciences discipline provides unique lower division general education transferable and nontransferable courses, as well as preparation for occupational certificate programs. No other discipline at Palo Verde College encompasses and teaches such a wide variety of topics. The Discipline provides students an opportunity to study human cultures, persons (past and present), social behavior, investigate the internal and external processes of Earth, and the natural relationships between geologic processes, natural resources, and the needs of society. Upon completion of this coursework, students should be able to use scientific methodologies to understand, describe, explain, and even predict human behavior and natural phenomenon. By knowing how people and social institutions function and relate to their physical surroundings, students can contribute to society.

PART II: ACCOMPLISHMENTS IN ACHIEVING GOALS OUTLINED IN THE PREVIOUS PROGRAM REVIEW

The Geoscience program developed and wrote a certificate program for Geographic Information Systems (GIS) during the academic year 2007-2008. Subsequently, the courses were added to the schedule for student enrollment. However, demands for the courses were inadequate and as a result the courses were dropped from the schedule. Equipment has been obtained to offer the courses through an on-line platform in the near future. It is believed that with the further development of Palo Verde College's online presence, a certificate program will become a viable option for students.

The Geoscience program developed and implemented courses to be taught online, serving students outside the immediate area, as well as our community students. All the courses contained within the Geosciences program are able to be taught online and are an integral part of the Associate's Degree program. Students will be able to complete the physical sciences and cultural sciences of their respective degree programs either using face-to-face, distance education, or online delivery methods.

The Geoscience program has implemented, across all courses offered, procedures to evaluate, monitor, and improve student success. These procedures are offered throughout the course of the semester and help to monitor student retention rates, success at understanding core concepts and topics, and improve instruction delivery. Different teaching methods have been utilized as a result of the findings from previous semesters' results. The method of delivery has incorporated open education resources that break-down the barrier that often prohibits students succeeding in courses. Additionally, teaching methods include multiple delivery options which are able to be tailored to student learning styles, making teaching of Geosciences more effective and fun.

PART III: POPULATIONS SERVED

DESCRIBE THE POPULATION SERVED BY THE PROGRAM, INCLUDING SPECIAL POPULATIONS.

The Geoscience program is open to all Palo Verde College Students and the general public interested in physical and Earth sciences. The students served by the Geosciences discipline are diverse with slightly more females (52%) than males (For the academic years of 2004 through 20011). Student ethnic diversity is also mixed, with no single ethnicity forming a majority. This is unusual, as historically under-represented people are less likely to take science courses. Thus this discipline is showing improvement in breaking down the ethnic barriers of education.

The Geosciences discipline serves approximately 90 students per semester. The course offering in the Discipline are currently meeting the needs of transfer students.

Initial surveys indicate that almost all of the students enrolled in Geoscience courses indicated transfer as an educational goal. Therefore, for most Geoscience students the program fulfills a general education science requirement and does not serve as preparation for a science degree or career. Continuing successful participation of Geoscience faculty in community education and service is reflected in the popularity of and reliable attendance in Geoscience classes.

DESCRIBE OTHER POPULATIONS THAT SHOULD BE SERVED BY THE PROGRAM, AND DESCRIBE PLANS TO SERVE THEM IN THE FUTURE.

Despite the improved ethnic diversity among students in this discipline, improvements can still be made in this area. The Geoscience discipline works closely with the National Park Service, the Diversity Recruitment Consortium, Solar utility industry and other outreach and community activities to continue to improve the level of diversity in the Discipline. Consideration will also be given to help plan ways to attract students to the fields and study of the sciences. Courses will continue to be developed that prepare students for and articulate with special programs such as the new UC Riverside/CSU Fresno joint degree in Environmental Studies.

Courses are now offered online, enabling students within and from outside the immediate area to enroll in and complete courses within the Geoscience program. Online courses have been consistently improving in terms of enrollment and student completion and success. Furthermore, as more courses outside the Geosciences program are offered via online delivery methods, popularity in these courses should and will likely grow. The growth of such courses and the continuation of delivering solid, well designed geoscience courses online will eventually allow students to complete courses necessary and obtain an Associate's Degree or transfer to a four-year institution.

Many classes are offered in the evenings so that working students can take classes and the timing also allows high school students the opportunity to attend as well. The Discipline does serve students of varying needs and interests, ideally, the program should enroll a greater number of students that are interested in a Geoscience-related degree and/or career, however national data suggests that nationally student interest in the geosciences is declining.

PART IV: CURRICULUM HISTORY

LIST THE COURSES OFFERED SUPPORTING THE PROGRAM OR CERTIFICATE. GIVE THE DATE OF FIRST OFFERING FOR EACH, AND INDICATE HOW MANY SECTIONS WERE SUCCESSFULLY OFFERED DURING EACH OF THE LAST FOUR REGULAR SEMESTERS (TWO YEARS).

Term	COURSE	SUCCESSFULLY OFFERED
Fall 2009	GEO 101: Physical Geography	3 Sections
	GEO 103: World Geography	1 Section
	GEL 105: Natural Disasters	1 Section
Term	COURSE	SUCCESSFULLY OFFERED
Spring 2010	GEO 101: Physical Geography	1 Section
	GEO 103: World Geography	1 Sections
	GEL 101: Physical Geology	1 Section
	GEL 105: Natural Disasters	1 Section

Term	COURSE	SUCCESSFULLY OFFERED
Fall 2010	GEO 101: Physical Geography	2 Sections
	GEO 104: Cultural Geography	1 Section
Term	COURSE	SUCCESSFULLY OFFERED
Spring 2011	GEO 101: Physical Geography	1 Section
	GEO 103: World Geography	1 Section
	GEL 101: Physical Geology	1 Section
	GEL 105: Natural Disasters	1 Section

LIST THOSE COURSES THAT HAVE NOT BEEN SUCCESSFULLY OFFERED AT LEAST ONCE DURING THE PRECEEDING SIX (6) SEMESTERS.

- GEO 107: Weather and Climate
- GEO 108: The Environment, Natural Resources and Conservation
- GEO 120: Introduction to Cartography
- GEO 130: Introduction to Geographic Information Systems
- GEO 230: Intermediate Geographic Information Systems
- GEO 231: Advanced Geographic Information Systems
- GEL 103: Environmental Geology

EXPLAIN WHY SUCH COURSES WERE NOT SUCCESSFULLY OFFERED.

Of the courses listed in the section above, almost all are newly developed and approved courses, or are courses still waiting final CSU/UC or IGETC approval. Therefore, those courses have not yet been offered since most students will not enroll in courses that do not indicate satisfaction of associate degree requirements or transferability to CSU/UC campuses. Additionally, these courses have recently undergone revision to include the ability to deliver them via online methods. It is the desire of the program to have these courses offered in the very near future.

Those that are not listed above have not been offered due to the restrictions and requirements in place when traveling off-campus during education-related activities. Specifically, the transportation regulations stipulated by the college limit the opportunities for offering the field trip classes. Therefore, they have been placed on "inactive status" in the college catalog.

PROVIDE A STRATEGY FOR IMPROVING THEIR SUCCESS, OR EXPLAIN WHY THEY SHOULD NOT BE REMOVED FROM THE PROGRAM.

Those recently added courses that meet associate degree requirements or are approved for transferability to CSU/UC campuses will be offered within the next several semesters. Historically, newly added courses have low enrollments during their initial inclusion in the class schedule. Therefore, these classes will be phased in, in an attempt to keep enrollment numbers in the Geoscience course on par with current levels or higher. Again, with the ability to deliver these courses via online delivery method, should and will make these courses a strong and viable offering for student success.

The courses that require in-the-field participation will be offered should there be a change in the college's policy regarding student's ability to drive personal vehicles to field activity sites. The Geosciences discipline will work with the college administrators to find a viable solution, one that protects the liability of the college, while at the same time offering a chance for students to participate in these activities under their own personal mode of transportation.

PART V: COURSE SCHEDULING AND AVAILABILITY

OPTIMIZES CLASS AVAILABILITY FOR DAY STUDENTS, EVENING STUDENTS AND DISTANCE EDUCATION STUDENTS.

The Geoscience discipline offers a wide range of courses to our students. Faculty teaches a total of 22 different courses, including 14 courses that have a laboratory component. The majority of the Discipline's courses transfer to CSU and UC campuses. The Discipline attempt to offer enough courses and sections to meet the needs of students during the day, evening, and off campus.

An important factor in offering courses that students need is the decision about when and where they are offered. Studies show that the number of hours students work per week is increasing. In most cases students are working between 15 and 25 hours/week, with 25% working more than 26 hours/week. Clearly, when students work this much, the scheduling of classes will be critical in determining if they can, in fact, take any classes. Palo Verde College instructors report a continuing pattern of large numbers of students attempting to add distance education classes at the beginning of the terms in an attempt to alleviate the restrictions of work schedules not coinciding with course offerings. The courses taught in the Discipline are difficult to learn via traditional distance education methods. Therefore we have developed, and will continue to develop, courses that can be taught on-line in an attempt to make the learning of scientific processes and methods mirror that of face-to-face instruction.

OPTIMIZES STUDENT LEARNING.

Quality of student learning may be reflected by student grades, student retention and student satisfaction. Student learning will be evaluated using retention rates (% of students that remain in the class until the end of the term), successful completion rates (% of students that receive A, B, or C grades in the class) and Survey data, beginning with the Fall 2002 term. The retention rate for Discipline courses is 81.3% and is an indication of our student's belief they can complete the course. This is especially remarkable given the nature of the Discipline's courses and their diversity. The transfer courses for science majors and non-science majors are rigorous and demand a commitment of time and energy from our students. The successful completion rates for the Discipline are respectable. Over the last six semesters, 89.6% of the students have completed Discipline courses successfully. Many factors can contribute to a student's ability to successfully complete a course. Quality of instruction, preparedness of students, course content, support services for specific courses and student workload are a few of the factors that affect student success.

PART VI: STUDENT LEARNING OUTCOMES

DESCRIBE THE PROCESS BY WHICH THE PROGRAM IDENTIFIES, MEASURES AND EVALUATES STUDENT LEARNING OUTCOMES AT THE COURSE, PROGRAM AND DEGREE LEVELS, AND PROVIDE EVIDENCE THAT THIS PROCESS IS BEING FOLLOWED.

The Division of Mathematics and Sciences at Palo Verde College believes that an understanding of mathematics and the sciences is an indispensable part of a sound education. Our goal is to provide all students with access to supportive, excellent education, where all students learn by direct experience with the methods and processes of inquiry. Our faculty are highly trained, committed to student development, and dedicated to helping students achieve their maximum potential. Our curriculum is structured to encourage students to engage in critical thinking and to help students realize that learning is a life-long endeavor.

The Geoscience discipline strives to maintain the currency of course content and laboratory exercises (where applicable). All course outlines have been reviewed and updated within the last two years. Each course outline defines course-specific learning outcomes. However, on a program-wide basis, the Math and Science Division has recently developed Student Learning Outcomes (SLO) applicable for all courses taught with the spectrum of Math and Science and has implemented assessment procedures and analysis of the SLOs.

- ***Demonstrate research, analytical reasoning, applied science and technological skills for real life expectations.***

The Geosciences Discipline have utilized pre- and post-tests, progressive quizzes, and rubrics since Spring 2007 term as an instrument for assessing learning outcomes.

With the recent addition of our online learning system, this task has been simplified, both in terms of delivery and analysis. The tests/quizzes are designed to involve students solving specific problems using several sets of particular data relevant to the Discipline. A rubric has been developed for scoring the various attributes of the project.

All assessment findings for the division will be compiled and cataloged giving each faculty the ability to evaluate outcomes at the course and division level. Following the time necessary for sufficient data collection, the Math and Science Division will compile the assessment findings and make the necessary recommendations for remediation, if necessary.

DESCRIBE THE PROCESS BY WHICH THE PROGRAM IMPROVEMENTS ARE MADE, AND PROVIDE EVIDENCE THAT THIS PROCESS IS BEING FOLLOWED.

Learning assessment is still in its early stages at Palo Verde College. The access to complete data sets provided by our Student Management and Enrollment System, necessary for compiling the necessary reports and thus improving upon the program is insufficient. The faculty of the Math and Science Division will work closely together to provide our students with any necessary program improvements, if identified.

PART VII: PROGRAM AND COURSE COVERAGE

DESCRIBE HOW EFFECTIVELY COURSES IN THE PROGRAM ARE COVERED BY FULL-TIME AND PART-TIME FACULTY.

The Geosciences faculty meets the minimum qualifications to be an instructor at Palo Verde College and is adequate to support the program at the Main Campus, as well as all distance education courses.

DESCRIBE ONGOING OR PROJECTED DEFICIENCIES IN FACULTY COVERAGE OF COURSES IN THE PROGRAM.

There is no need for additional support staff for the Geosciences program at this time. However, due to the nature and expertise necessary, it will be likely that an adjunct faculty member will be utilized to cover the course taught in Geographic Information Systems.

PART VIII: PROFESSIONAL DEVELOPMENT

DESCRIBE SPECIFIC PROFESSIONAL DEVELOPMENT ACTIVITIES IN WHICH FACULTY MEMBERS IN THE PROGRAM PARTICIPATE, AND EXPLAIN HOW SUCH ACTIVITIES BENEFIT OR ENHANCE THE PROGRAM AND SUPPORT AND FACILITATE STUDENT LEARNING.

The Geoscience faculty are involved in campus activities and are active in the community and professional organizations, continuing their education and participating in activities that utilize or increase their expertise. Instructors routinely participate in professional development in terms of continuing professional education and seminars. Instructors attend professional workshops available through the various discipline-related organizations and federal, state and regional organizations. Faculty also enroll in university courses to keep current in their field. Faculty of the Geosciences program regularly participate in in-service activities, including College Flex Day trainings, college seminars, and other professional growth opportunities offered on campus. Currently, there is much interest in open educational resources and service learning. The faculty is heavily involved in providing students access to free educational materials to lessen the financial burden students face, and has placed many students in seasonal, temporary or career oriented places of employment.

DESCRIBE AREAS OF UNMET PROFESSIONAL DEVELOPMENT NEEDS AMONG FACULTY IN THE PROGRAM.

At this time, all professional development is currently being met, thus there are no plans to address the needs to rectify any deficiency.

PART IV: STUDENT PERFORMANCE AND COMPLETION.

DISPLAY AND COMMENT ON SEMESTER-BY-SEMESTER COURSE COMPLETIONS IN THE PROGRAM OVER THE PRECEDING SIX (6) SEMESTERS.

Term	Total Student Enrollment for Discipline	# of Students Successfully Completed Course	# of Students Withdrew	Average Student Retention
Fall 2008	90	54	26	71.0%
Spring 2009	90	55	24	73.3%
Fall 2009	91	65	15	83.5%
Spring 2010	77	55	15	80.5%
Fall 2010	62	43	12	80.6%

Spring 2011	69	51	9	86.9%
			Total Avg.	79.3%

The retention rate for Geoscience discipline courses over the last six semesters is 79.3% and is an indication of our student's belief they can complete the course. This is especially remarkable given the nature of the Discipline's courses and their diversity. The successful completion rates for the Discipline are respectable. Over the last six semesters, 89.6% of the students have completed Discipline courses successfully.

PART X: ENROLLMENT AND FINANCIAL TRENDS.

DISPLAY AND COMMENT ON SEMESTER-BY-SEMESTER ENROLLMENT IN THE PROGRAM OVER THE PRECEDING SIX (6) SEMESTERS.

Term	Enrollment
Fall 2008	90
Spring 2009	90
Fall 2009	91
Spring 2010	77
Fall 2010	62
Spring 2011	69

Enrollment over the past six semesters has shown a familiar trend when a campus is in the development phase of a discipline program. Historically, enrollment numbers are predictably varied during the phase in period of a program. Recent enrollment has decreased and is constant with the overall college unduplicated headcounts for the last six semesters. This decrease in enrollment is two-fold: 1. The financial situation of the college has impacted class size and offering greatly, and 2. During the last 4 ½ years the faculty has served as division chair, reducing the number of courses offered during those years.

DISPLAY AND COMMENT ON SEMESTER-BY-SEMESTER EXPENSES INCURRED BY THE PROGRAM OVER THE PRECEDING SIX (6) SEMESTERS.

	Salaries	Benefits	Supplies	Contracts	Capital	TOTAL
2008-2009						
Geology	$ 29,940.00	$ 6,764.00	$ 26.50	$ 75.00	$ -	$ 36,805.50
Geography	$ 29,940.00	$ 6,764.00	$ 94.52	$ 147.56	$ -	$ 36,946.08
						$ -
						$ -

						$ -
						$ -
	$59,880.00	**$13,528.00**	**$ 121.02**	**$ 242.08**	**$ -**	**$ 73,751.58**

	Salaries	**Benefits**	**Supplies**	**Contracts**	**Capital**	**TOTAL**
2009-2010						
Geology	$ 31,763.00	$ 6,991.00	$ 114.00	$ -	$ -	$ 38,868.00
Geography	$ 31,763.00	$ 6,991.00	$ 146.37	$ -	$ -	$ 38,900.37
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
	$ 63,526.00	**$13,982.00**	**$ 260.37**	**$ -**	**$ -**	**$ 77,768.37**
	Salaries	**Benefits**	**Supplies**	**Contracts**	**Capital**	**TOTAL**
2010-2011						
Geology	$ 22,901.00	$ 5,706.00	$ -	$ -	$ -	$ 28,607.00
Geography	$ 42,531.00	$ 9,427.00	$ 19.15	$ -	$ -	$ 51,977.15
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
	$ 71,138.00	**$15,133.00**	**$ 19.15**	**$ -**	**$ -**	**$ 80,584.15**

The expenses occurred by the Geosciences discipline are appropriate for current enrollment and program activities.

PART XI: FACILITIES AND EQUIPMENT

ARE CURRENT FACILITIES, SUCH AS CLASSROOMS, OFFICES AND EQUIPMENT, ADEQUATE TO SUPPORT THE PROGRAM?

The Geoscience discipline is housed within the Classroom Building and has a dedicated lecture/laboratory classroom. The facilities utilized by the Discipline were constructed within the last six years and is in excellent condition. Adjoining the dedicated classroom is the faculty office, allowing for ease of and simultaneous access to the teaching forum and faculty office. There is an extensive specimen storage area adjacent to the classroom as well. All of the facilities are adequate for the support of this program.

Both the classroom and faculty office have a dedicated computer station each. In addition, the classroom has dedicated polycom, starboard, media playing devices and a digital projection and sound system. Laboratory equipment is limited, but adequate to support the program. The addition of new equipment annually is growing the opportunities for student to apply hands-on experiences to the topics of Geology and Geography.

PART XII: STRENGTHS AND WEAKNESSES

LIST AND COMMENT ON THE MAJOR STRENGTHS OF THE PROGRAM.

- The Geosciences Discipline provides our students with a wide variety of courses designed to meet their varied needs and requirements.
- Our primary goal is to facilitate student growth and success and at the same time maintain academic standards appropriate to our courses.
- Continue to coordinate course offerings with changes in requirements of the various CSU and UC campuses, as well as, the changing vocational needs of students.
- Geosciences faculty bring years of education, practical work experience, and training to every class.
- Geosciences maintain a steady student enrollment in classes.
- The ability to provide adequate off-campus laboratory instruction.

LIST AND COMMENT ON THE MAJOR WEAKNESSES OF THE PROGRAM.

- Lack of qualified tutoring services that have the knowledge base to tutor students in the Geosciences. A consistent question received from students is directed at where they can obtain help outside of the classroom. Currently there are no tutors in the Learning Skills Center qualified to tutor Geoscience students. As a result, the faculty assumes the role of tutor, allowing students in need to receive extra learning opportunities.

PART XIII: PLANS TO REMEDY WEAKNESSES.

IDENTIFY SPECIFIC STEPS TO CORRECT IDENTIFIED WEAKNESSES AND PROVIDE THE TIMELINE BY WHICH THEY ARE TO BE CORRECTED.

- In order to have a qualified tutor that is able to tutor students in Geosciences, that student must have already successfully completed core courses within the Geosciences discipline. An incentive of monetary compensation (employment) might improve the chances that a former Geosciences student would consider occupying such a position. Currently there are no monies

dedicated that would allow this to occur; however, recent budget requests are being considered.

PART XIV: PLANS TO ADVANCE THE PROGRAM.

DESCRIBE OTHER PLANS THAT WILL ADVANCE THE PROGRAM.

The Geosciences Discipline is committed to providing out students with the best possible education. To that end we need to continue to establish procedures for evaluating our successes and failures and employ them on a regular basis. We need to monitor all of our courses' retention and success rates and develop plans to address any problem areas that are identified. We need to develop the use of different teaching methods that reach across a broad spectrum of student intellectualism. We need to continue to develop evaluation methods that monitor the effectiveness of our teaching techniques.