

## 2006-2007 Department of Physical Science Assessment Plan

### Expanded Statement of Institutional Purpose

#### Mission Statement

##### Chemistry

Chemistry, the central science, is an active discipline vital to human existence and essential to the understanding of industrial, economic, and environmental issues. The mission of chemistry is to instill an understanding of chemistry and its relevance through quality teaching, scholarly and professional activities, and service. In a world that is becoming increasingly more technical and complex, providing chemical instruction with the depth, breadth, and rigor for students to meet this need is critical.

##### Geoscience and Physics

Geosciences and Physics strive to provide students at Southern Utah University with excellence in physical science education. Our integrated efforts are directed toward those methods we feel produce the best possible educational experience. The primary goal of the geoscience and physics faculty is to ensure academic excellence in our students while demanding integrity, building self-esteem, and developing critical thinking skills.

#### Goal Statement

##### Chemistry will:

1. Provide expert instruction in all classroom settings: lectures, labs, recitations, etc.
2. Provide students competitive opportunities for scholarship, employment, and other / hands-on experiences with qualified faculty mentors.
3. In a personalized environment, educate students to think critically and independently, and to improve communicative, creative, analytic and information gathering skills.
4. Prepare students who choose to pursue graduate degrees upon graduation either in chemistry or the health sciences.
5. Surveys of general education and service course students will be conducted to assess success of our courses in providing background knowledge.

### Program Intended Educational Outcomes- 2006-2007

#### Outcomes/Objectives

##### Chemistry

- 1a. Courses will be taught by faculty with appropriate expertise and excellence in their fields of teaching.
- 1b. Students will learn and demonstrate an understanding of theoretical chemical principles.
- 2a. Qualified faculty mentors with appropriate expertise in their fields will offer chemistry laboratories, scholarship, employment, and other hands-on experiences for students.
- 2b. Students will practice and demonstrate chemistry principles via laboratory experiments, undergraduate research / employment, discussions out of class, etc.
- 3a. Students will learn and demonstrate the ability to critically think about chemistry principles, and to communicate such items via oral and written means.
- 3b. Class size will be limited to what is pedagogically most appropriate and meets ACS criteria.
- 4a. Students desiring graduate degrees will have the opportunity to develop and demonstrate their abilities to meet entrance requirements: tests, scholarship, etc.
- 4b. Appropriate tracks of study will be provided for professional, health care and forensic emphases.
- 5a. Students desiring employment upon graduation will be prepared for business, industry, or education.
- 5b. Appropriate tracks of study will be provided for professional chemistry and education majors.
6. In addition to offering courses for the campus general education program, the division will provide chemistry courses that can meet the needs of chemistry majors as well as other academic majors.
- 7a. The chemistry curriculum will be approved by the American Chemical Society (ACS), assuming that adequate resources are available to meet ACS criteria.
- 7b. Chemistry will continue to align the chemistry curricula at SUU with the nationalized ACS curricula.
- 7c. Chemistry will continue to utilize the nationalized ACS exams as final exams for each course in the SUU chemistry curricula.
- 7d. Chemistry will continue to require all graduating seniors to take the Educational Testing Service (ETS) field exams.

### Means of Program Assessment and Criteria for Success

#### Assessment Criteria and Activities

##### Chemistry

- 1a./2a. Only doctoral qualified faculty with demonstrated expertise and above-average teaching performance in appropriate chemistry sub-fields will be hired, promoted, and retained in tenured positions. Faculty will annually attend faculty development activities to enhance subject knowledge and presentation methods.
- 1b./2b. Chemistry students will pass their major courses with a minimum grade of "C" or better. The average score on the ACS final exam by students in each chemistry course will meet or exceed the 50<sup>th</sup> percentile. The average score on each section of the ETS field exams by graduating seniors will exceed the 50<sup>th</sup> percentile. Graduating seniors will also have had undergraduate research or employment opportunities.
- 3a. A capstone course will assess each student's ability to communicate via a written and oral report, which will also evaluate prior "course embedded activities" requiring critical, logical, and analytical thinking.
- 3b. Sizes of classes will be monitored relative to scores on ACS final exams and ETS field exams. For most chemistry courses they will be limited to 50 students.
4. Scores of students or entrance success relative to admittance standards in graduate chemistry programs will be tracked. In addition, Dental Admission Test (DAT), Medical College Admission Test (MCAT), and other relevant scores will be monitored for determining subject matter mastery. (Also, see 1b/2b above).
5. Placement of graduates will be monitored annually. Surveys of students and employers will assess chemistry graduates preparedness.
6. Surveys of general education students will be implemented to assess success of courses.
- 7a. The chemistry curriculum has been submitted for approval by ACS and a report has been received from the ACS detailing what items must be addressed and improved.
- 7b. For best practice and economy, only ACS approved courses will be included in the major curricula.
- 7c/7d. See item 1b./2b. above relative to requirements on ACS final exams and ETS field exams in chemistry.

6. Prepare students who choose to pursue employment upon graduation in a science related field in business/industry/education.
7. Provide service courses for other academic and professional programs, and for the general education experience

Meet or exceed standards of an approved chemistry curriculum as established by the American Chemical Society (ACS)

Geosciences and Physics will:

8. Provide expert instruction in all teaching settings: lectures, labs, field trips, etc.
9. Provide expert direction/instruction for competitive opportunities in scholarship, employment, and other experiences.
10. Educate students to think critically and independently, and to improve communicative, creative, analytic and information gathering skills.
11. Prepare students who choose to pursue pre-professional (physics) or graduate (geology) education.
12. Prepare students who choose to pursue employment in a science related field in business, industry, or public education upon graduation.
13. Provide service courses for other academic and professional programs and for the general education purpose.

Geoscience & Physics

1. Courses will be taught by faculty with expertise appropriate to their teaching assignments.
- 2a. Laboratories, field experiences, and other hands-on experiences will be conducted by faculty members with appropriate expertise in their fields.
- 2b. Students will practice and demonstrate understanding of theoretical and applied principles via laboratory experiments, undergraduate research, field experiences, etc.
- 2c. Graduates in geoscience will write a senior thesis based on their independent research.
3. Students will learn and demonstrate the ability to critically think about physical science principles, and to communicate them orally and in writing.
- 4a. Students desiring professional/graduate degrees will have the opportunity to develop and demonstrate their abilities to meet entrance requirements: tests, scholarship, etc.
- 4b. Appropriate curricula will be provided for pre-professional/graduate preparation.
- 5a. Students desiring employment upon graduation will be prepared for business, industry, or public education.
- 5b. Appropriate curricula will be provided for technician/physical science employment.
6. In addition to offering courses for the campus general education program, geoscience and physics will provide courses that meet the needs of other academic majors (engineering, chemistry, forestry, biology, etc).

Geoscience & Physics

- 1./2a. Only doctoral or professionally qualified faculty with appropriate expertise who are evaluated in teaching, scholarship, and service at least as standard performance (SP) in all areas will be hired, promoted, and tenured. Faculty will participate annually in development activities to enhance subject knowledge and presentation methods.
- 2b. Geoscience and physics students will pass their "major" courses with a grade of "C" or better. Graduating seniors will perform acceptably on the general portions of the Graduate Records Examination (GRE) and pre-professional admissions exams (MCAT and DAT).
- 2c. Geoscience students will also complete directed undergraduate research/senior thesis projects, including presentation of the results at state, regional, or national professional meetings.
3. Capstone geoscience experiences (senior thesis and field camp) will assess each student's ability to communicate via written and oral reports. Their success in these activities will provide evaluation of prior "course embedded activities" requiring critical, logical, and analytical thinking.
- 4a./4b. Graduate acceptance/entrance success in graduate geoscience programs will be tracked. In addition, GRE and other relevant scores will be monitored for determining subject matter mastery. (Also, see 2b. above).
- 5a./5b. Placement of graduates will be monitored annually. Surveys of both students and employers will assess preparedness of geoscience graduates.
6. Surveys of general education and service course students will be conducted to assess success of our courses in providing background knowledge.