

## APPENDIX A

### DEPARTMENT OF EARTH & ENVIRONMENTAL SCIENCES

#### California State University, Fresno

Bachelor of Science in Geology  
Student Outcomes Assessment Plan

#### MISSION STATEMENT

The Department of Earth & Environmental Sciences prepares students to pursue a broad range of careers in academia, industry, government, and teaching by providing them with educational training and opportunities to obtain a solid foundation in the Earth Sciences. Earth Sciences are interdisciplinary, integrating principles of physics, chemistry, biology, and mathematics, as well as quantitative and critical thinking skills, to address geological and environmental issues related to the solid earth, the oceans, and the atmosphere. To this end, the Department's programs and courses are designed to encompass a broad spectrum of basic scientific disciplines.

#### GOALS

1. **To provide geology students with a strong background in the Earth Sciences and in supporting disciplines.**

#### **Objectives:**

Graduates from this degree program should

- 1A) Acquire a mastery of knowledge relevant to the basic components of Earth Sciences.
- 1B) Develop a command of map skills, including reading and interpretation of geologic, topographic, and other maps, as well as map making.
- 1C) Acquire competency and skills in chemistry, physics and mathematics that are related to, and supportive of, the upper division Earth Science curriculum.

- 2. To educate students in the basic methods and philosophy used to conduct scientific research, particularly in the Earth Sciences.**

**Objectives:**

Graduates from this degree program should be able to

- 2A) Use the scientific method to organize and conduct research.
- 2B) Demonstrate knowledge of the information resources available in the Earth Sciences such as scientific journals, geologic databases, and internet resources.
- 2C) Be able to collect original data using field techniques and archival material.
- 2D) Apply quantitative methods to solve problems, analyze data and formulate models.
- 2E) Develop the ability to work independently and collaboratively in teams to solve open-ended questions.

- 3. To help students develop effective oral and written communication skills.**

**Objectives:**

Graduates from this degree program should be able to

- 3A) Effectively disseminate technical findings and conclusions by means of written reports in the format used in professional/technical writing.
- 3B) Organize and give professional oral presentations.
- 3C) Use maps, three-dimensional diagrams and other earth imagery to summarize findings and display them to a range of different audiences.

4. **To provide students with an opportunity to become familiar with the function and use of scientific instruments.**

**Objectives:**

Graduates from this degree program should be able to

- 4A) Use a variety of field geological equipment for data collection.
  - 4B) Use common geological laboratory instrumentation and equipment.
  - 4C) Perform data analysis and interpretation using computers.
5. **To encourage students to develop intellectual independence and academic skills that will assist them in continuing to learn after graduation.**

**Objective:**

- 5A) Provide students with culminating experiences in Earth Sciences that allows them to integrate knowledge previously acquired throughout the curriculum into independent projects.

## ASSESSMENT METHODS

| Assessment Activity                | Year 1   | Year 2                     | Year 3   | Year 4                                       | Year 5                     |
|------------------------------------|----------|----------------------------|----------|--|----------------------------|
| Core Curriculum Review             |          |                            |          | Done in 2005, a year before the target date. | <b>X*</b><br>*last in 2005 |
| Student Performance Appraisal      |          |                            |          |  | <b>X</b>                   |
| Geology 104 Scientific Writing     | <b>X</b> |                            |          |  |                            |
| Geology 107 Advanced Field Methods |          |                            | <b>X</b> |  |                            |
| Senior Exit Survey                 | <b>X</b> | <b>X</b>                   | <b>X</b> | <b>X</b>                                     | <b>X</b>                   |
| Alumni Survey                      |          | <b>X*</b><br>*last in 1999 |          |  |                            |
| Employer Survey                    |          |                            |          | <b>X</b>                                     |                            |
| Pipeline Analysis                  | <b>X</b> | <b>X</b>                   | <b>X</b> | <b>X</b>                                     | <b>X</b>                   |

Table 1. Assessment timeline and methods.

### Core Curriculum Review

The Department of Earth & Environmental Sciences will thoroughly evaluate and revise its curriculum on a regular basis. The last core curriculum review was conducted in 2005, with the previous one in 1999; the next review is scheduled for the fifth year of the next five year

assessment plan (Table 1). The evaluation will take into account changing job markets, advances in Earth Sciences, student feedback on courses, and employer feedback on students and their training.

### Student Performance Appraisal

Student learning is assessed primarily through the following standard classroom methods. Table 2 shows the correlation between the curriculum and the objectives established for the Bachelor of Science degree in Geology.

| OBJECTIVES                                 | 1A | 1B | 1C | 2A | 2B | 2C | 2D | 2E | 3A | 3B | 3C | 4A | 4B | 4C | 5A |
|--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| <b><u>CORE COURSES</u></b>                 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <b>LOWER DIVISION</b>                      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Physical Geology                           | X  | X  |    |    |    |    |    |    |    |    |    |    | X  |    |    |
| Mineralogy                                 | X  |    |    |    |    |    |    |    |    |    |    |    | X  |    |    |
| Crystallography                            | X  |    |    |    |    |    |    |    |    |    |    |    | X  | X  |    |
| Optical Mineralogy                         | X  |    |    |    |    |    |    |    |    |    |    |    | X  |    |    |
| Introductory Field Methods                 | X  | X  |    |    |    |    |    |    |    |    |    | X  |    |    |    |
| General Physics 2A                         |    |    |    | X  |    |    |    |    |    |    |    |    |    |    |    |
| General Physics 2B                         |    |    |    | X  |    |    |    |    |    |    |    |    |    |    |    |
| General Chemistry                          |    |    |    | X  |    |    |    |    |    |    |    |    |    |    |    |
| General Chemistry & Qual. Analysis         |    |    |    | X  |    |    |    |    |    |    |    |    |    |    |    |
| Mathematical Analysis                      |    |    |    | X  |    |    |    |    |    |    |    |    |    |    |    |
| <b>UPPER DIVISION</b>                      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Igneous & Metamorphic Petrology            | X  |    |    | X  | X  | X  | X  | X  | X  |    |    | X  | X  | X  |    |
| Sedimentology                              | X  |    |    | X  | X  | X  | X  | X  | X  |    |    | X  | X  | X  |    |
| Scientific Writing                         | X  |    |    | X  | X  | X  |    | X  | X  | X  |    |    |    |    |    |
| Geomorphology                              | X  | X  |    | X  | X  | X  | X  | X  | X  |    | X  | X  | X  |    |    |
| Structural Geology                         | X  | X  |    | X  | X  | X  | X  | X  | X  |    | X  | X  | X  | X  |    |
| Paleontology                               | X  |    |    | X  | X  | X  |    | X  | X  | X  |    |    | X  |    |    |
| Stratigraphy                               | X  |    |    | X  | X  | X  |    | X  | X  |    | X  | X  | X  |    |    |
| Advanced Field Methods                     | X  | X  |    | X  | X  | X  | X  | X  | X  |    | X  | X  |    | X  |    |
| Computer Applic. In Geol. (or Math 77)     | X  | X  | X  | X  | X  | X  | X  | X  | X  |    | X  |    |    | X  |    |
| Quantitative Methods in Geol. (or Math 76) | X  |    | X  |    |    |    | X  | X  |    |    |    |    |    | X  |    |
| Field Geology                              | X  | X  |    | X  | X  | X  | X  | X  | X  |    | X  | X  | X  | X  | X  |

Table 2. Correlation between the Geology major undergraduate curriculum and student outcomes assessment plan objectives for the Department of Earth & Environmental Sciences.

### *Research papers, oral reports, field projects*

Students are asked to summarize, evaluate, and utilize technical readings in research papers, oral reports, and field projects. The students' ability to understand and summarize these readings provides a means for assessing their mastery of the basic components of Earth Sciences. Students' work on these assignments is always evaluated by the class instructor, who provides students with both written comments and a grade. Occasionally, fellow students provide peer review on the oral presentations and report drafts. In particular, two scoring rubrics have been developed for Geology 104 (Scientific Writing) in order to evaluate student performance on both a written field project report and a mock professional meeting oral presentation (SOAP Appendix A).

### *Examination*

Students' ability to understand and interpret subject matter is tested by written examination. Exams are evaluated by the instructor and assigned a grade.

### *Maps and other spatial imagery*

Students produce original maps and other spatial imagery to solve problems in the Earth Sciences. This material is evaluated by the instructor.

### *Culminating experiences*

Students conduct original research and/or produce review summaries in many of the upper-division core courses. These assignments require the students to synthesize their knowledge acquired in earlier classes, apply the skill they have learned to conduct the research, and describe and explain their results to an educated audience. Some assignments require that students develop hypotheses or lines of investigation required to solve a problem; collect original or archival data; and analyze and summarize data using computer, quantitative and mapping tools. These assignments are guided and evaluated by the instructor. A scoring rubric has been

developed for Geology 107 (Advanced Field Methods) to assess student performance in producing a professional quality geologic map (SOAP Appendix B).

### Alumni Survey

The Department of Earth & Environmental Sciences will contact alumni to solicit their comments on the Geology undergraduate program's strengths and weaknesses and what the Department can do to improve the educational experience for future students.

### Senior Exit Survey

Graduating seniors will be surveyed about their reason for choosing the Geology program, their long-term career goal, their opinions of their university and department experiences, their assessment of the Geology program and the faculty, and suggestions for improvements to the program (SOAP Appendix C).

### Employer Survey

The Department of Earth & Environmental Sciences will solicit comments from student employers regarding the qualifications of our students and the strengths and weaknesses of their training.

### Pipeline Analysis

This assessment method is designed to follow the progress of students who become Geology majors starting in Fall 2002. A detailed analysis of student record data will be used to answer questions such as:

1. Are students taking major courses in the appropriate sequence?
2. At what points is the program losing students from the major?
3. Do those students who leave the program transfer to other majors or leave the university?
4. Are there a disproportionate number of minority students lost from the program?
5. Does the success of transfer students differ from students who began their major at CSUF?
6. Are we able to identify predictors of success or failure that permit us to provide more effective support for at-risk students?

### **ASSESSMENT PLAN IMPLEMENTATION**

1. The Department will select a faculty member to coordinate assessment activities.
2. The assessment coordinator will oversee implementation of the assessment plan according to the schedule outlined in Table 1.
3. Specific assessment methods will be handled as follows:
  - a. Core Curriculum Review: This will be conducted by the faculty as a group.
  - b. Student Performance Appraisal: The faculty will collate performance data from classes selected for assessment and provide the data to the assessment coordinator. Two courses, in particular, have been selected for inclusion in this phase of assessment. They include:

- i. Geology 104 (Scientific Writing): The faculty instructing the class will conduct the assessment and provide the results to the assessment coordinator.
  - ii. Geology 107 (Advanced Field Methods): The faculty instructing the class will conduct the assessment and provide the results to the assessment coordinator.
- c. Alumni Survey: The assessment coordinator will send out the survey and collate information from alumni responses.
- d. Senior Exit Survey: At the time of graduation, undergraduates will obtain a copy of the survey from the Department office, complete it, and return it. The completed surveys will be kept in a file in the Department office. The assessment coordinator will summarize the information contained in the surveys on an annual basis.
- e. Employer Survey: The assessment coordinator, with the assistance of Department faculty, will develop a list of employers to query and develop a survey form. Employer responses will be sent to the assessment coordinator who will summarize the information.
- f. Pipeline Analysis: The assessment coordinator, with the assistance of Department faculty and staff, will monitor the status and progress of geology majors throughout their academic careers according to the provisions outlined in the pipeline analysis.

4. Annually, the assessment coordinator will summarize the results of assessment activities and provide the results to the faculty. The faculty will meet to discuss the outcomes and make recommendations for improvements to the program.

| Objective | Core Curriculum Review | Student Performance Appraisal | Geology 104 | Geology 107 | Senior Exit Survey | Alumni Survey | Employer Survey | Pipeline Analysis |
|-----------|------------------------|-------------------------------|-------------|-------------|--------------------|---------------|-----------------|-------------------|
| 1A        | X                      | X                             | X           | X           |                    | X             | X               |                   |
| 1B        | X                      | X                             |             | X           |                    | X             | X               |                   |
| 1C        | X                      | X                             |             |             |                    | X             | X               |                   |
| 2A        | X                      | X                             | X           | X           |                    | X             | X               |                   |
| 2B        | X                      | X                             | X           | X           |                    | X             | X               |                   |
| 2C        | X                      | X                             |             | X           |                    | X             | X               |                   |
| 2D        | X                      | X                             |             | X           |                    | X             | X               |                   |
| 2E        | X                      | X                             | X           | X           |                    | X             | X               |                   |
| 3A        | X                      | X                             | X           | X           |                    | X             | X               |                   |
| 3B        | X                      | X                             | X           |             |                    | X             | X               |                   |
| 3C        | X                      | X                             |             | X           |                    | X             | X               |                   |
| 4A        | X                      | X                             |             | X           |                    | X             | X               |                   |
| 4B        | X                      | X                             |             |             |                    | X             | X               |                   |
| 4C        | X                      | X                             |             | X           |                    | X             | X               |                   |
| 5A        | X                      | X                             |             | X           |                    | X             | X               |                   |

Table 3. Correlation between assessment activities and Geology undergraduate program assessment plan objectives they will measure.

**SOAP  
(Appendix A)**

**GEOLOGY 104 (SCIENTIFIC WRITING)  
ORAL PRESENTATION SCORING RUBRIC  
&  
FINAL REPORT SCORING RUBRIC**

Presenter: \_\_\_\_\_

Title: \_\_\_\_\_

Total Score: \_\_\_\_\_ / 100

### Oral Presentation

Rating: 1 = poor, 2 = fair, 3 = moderate, 4 = good, 5 = excellent.

TARGET AUDIENCE ( \_\_\_\_\_ x 5 = \_\_\_\_\_ )

Was the presentation appropriate for the audience?

CONTENT ( \_\_\_\_\_ x 5 = \_\_\_\_\_ )

How well informed on the topic was the presenter?

PRESENTATION ( \_\_\_\_\_ )

1) Style (overall rating)

- a) Audience contact / rapport
- b) Pace / amount of material covered
- c) Organization, sequence
- d) Originality of presentation method

2) Clarity (overall rating)

- a) Speech mannerisms "uh", "you know", etc.
- b) Tone and enunciation
- c) Word usage and jargon

3) Diagrams and figures

Effectiveness, appropriateness, number, clarity

|  | 1     | 2     | 3     | 4     | 5     |
|--|-------|-------|-------|-------|-------|
| Was the presentation appropriate for the audience? | _____ | _____ | _____ | _____ | _____ |
| How well informed on the topic was the presenter?  | _____ | _____ | _____ | _____ | _____ |
| Style (overall rating)                             |       |       |       |       |       |
| a) Audience contact / rapport                      | _____ | _____ | _____ | _____ | _____ |
| b) Pace / amount of material covered               | _____ | _____ | _____ | _____ | _____ |
| c) Organization, sequence                          | _____ | _____ | _____ | _____ | _____ |
| d) Originality of presentation method              | _____ | _____ | _____ | _____ | _____ |
| Clarity (overall rating)                           |       |       |       |       |       |
| a) Speech mannerisms "uh", "you know", etc.        | _____ | _____ | _____ | _____ | _____ |
| b) Tone and enunciation                            | _____ | _____ | _____ | _____ | _____ |
| c) Word usage and jargon                           | _____ | _____ | _____ | _____ | _____ |
| Diagrams and figures                               | _____ | _____ | _____ | _____ | _____ |

COMMENTS:

Author: \_\_\_\_\_

Geology 104  
Scientific Writing  
Developed by R. Brady

Title: \_\_\_\_\_

WRITING EVALUATION

Score: \_\_\_\_\_ / 100

DEVELOPMENT AND LOGIC (3 each) Total \_\_\_\_\_

Focus or thesis not clearly presented or inconsistent \_\_\_\_\_

Development weak: ideas poorly developed, vague; meaning unclear. \_\_\_\_\_

Poorly documented: inferences don't follow from data. Interpretations not separated from observations. \_\_\_\_\_

Logic and reasoning unsound. \_\_\_\_\_

COMPOSITION (2 each) Total \_\_\_\_\_

Professional style violated; inappropriate tone. \_\_\_\_\_

Paragraph structure: introduction, transition weak or poor. \_\_\_\_\_

Paragraph not coherent due to misplaced or extraneous material. \_\_\_\_\_

MECHANICS (1 each) Total \_\_\_\_\_

Sentences: \_\_\_\_\_

Misplaced or inappropriate modifiers. \_\_\_\_\_

Verb-subject agreement. \_\_\_\_\_

Awkward construction; run-on. \_\_\_\_\_

Misplaced or unclear subject; unclear pronoun reference. \_\_\_\_\_

Non-sentence or fragment. \_\_\_\_\_

Non-parallel construction. \_\_\_\_\_

Faulty subordination. \_\_\_\_\_

Inappropriate language: trite, jargon, pretentious. Including: "is found", "reveals", "is seen", "you have", "shows". \_\_\_\_\_

Tense not consistent; inappropriate. \_\_\_\_\_

Ineffective or overused passive voice. \_\_\_\_\_

Not concise: wordiness (deadwood) due to excessive prep phrases or trite expressions; redundant. \_\_\_\_\_

Missing or improper punctuation, especially hyphens and semi-colons. \_\_\_\_\_

Misspelling / Typographical errors. \_\_\_\_\_

Improper or inconsistent use of numerical data including units; data not quantified. \_\_\_\_\_

Improper word choice; vague meaning. \_\_\_\_\_

ORGANIZATION, FORMAT, EXECUTION (1 each) Total \_\_\_\_\_

Insufficient or inappropriate headings and sub-headings. \_\_\_\_\_

Improper citation form; references in text not cited; incomplete. \_\_\_\_\_

Figures: incompletely captioned; illegible; incorrectly referenced; incorrectly placed; incorrect margins, improper or inadequate. \_\_\_\_\_

Presentation: inappropriate organization, margins, page numbers, binder, map pockets, paper. \_\_\_\_\_

Good:

Needs improving:

**SOAP**  
**(Appendix B)**

**GEOLOGY 107 (ADVANCED FIELD METHODS IN GEOLOGY)**

**GEOLOGIC MAPS SCORING RUBRIC**

## Geologic Maps Scoring Rubric

A B C D F

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### Overall presentation and accuracy

- — — — — Detail and completeness of map
- — — — — Neatness and quality of drafting
- — — — — Accuracy of lithologic and fault contacts
- — — — — Suitable number and accuracy of strike and dip symbols
- — — — — Selection of unit colors is appropriate and distinctive
- — — — — Appropriate density and distribution of unit symbols
- — — — — Specimen numbers and locations indicated

### Map labels

- — — — — Suitable map title
- — — — — Name of map author on map
- — — — — Date of mapping written on map
- — — — — Location of mapping area or reference points indicated
- — — — — North arrow and magnetic declination (and date of declination)
- — — — — Scales, graphic and representative fraction displayed
- — — — — Contour interval indicated
- — — — — Cross section line(s) accurately drawn and labelled
- — — — — Neat, evenly applied, generally light coloring of units

A B C D F

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### Map key

- — — — — Layout of explanation neat and orderly
- — — — — Correct sequence of units (oldest on bottom, youngest at top)
- — — — — Names of units indicated
- — — — — Unit symbols indicated
- — — — — Ages of units shown
- — — — — Contact relationships between units shown
- — — — — All other appropriate map symbols displayed and defined: faults, folds, bedding attitudes, cross section lines, etc.

### Faults

- — — — — Fault contacts shown
- — — — — Faults classified correctly
- — — — — Dips of faults shown
- — — — — Direction of movement identified

### Folds

- — — — — Trace of axial surface located and designated properly
- — — — — Plunges measured accurately
- — — — — Correct structural map symbols used

### Other

— — — — — \_\_\_\_\_

— — — — — **OVERALL SCORE**

**SOAP**  
**(Appendix C)**

**SENIOR EXIT SURVEY**

Exit Interview Questionnaire

**Geology Undergraduate Program**

**Department of Earth and Environmental Sciences**

Name of Graduating Student:

Degree: Bachelor of Science in Geology

Semester/Year received:

International Student: Yes / No

Do you belong to a minority or economically disadvantaged group (Optional): Yes/ No

Ethnicity (Optional): \_\_\_\_\_

Your Age (Optional): \_\_\_\_\_ Sex (Optional): M / F

Did you have an off-campus full-time or part-time job when you were a student in this program? (You may exclude the time when you were just finishing your thesis project).  
Yes / No.

**Why did you choose this program? (If more than one apply, please rank by numbers).**

- A. \_\_\_ Location of the university.
- B. \_\_\_ Academic reputation of the department.
- C. \_\_\_ Program content.
- D. \_\_\_ Faculty expertise and/or reputation.
- E. \_\_\_ Financial consideration.
- F. \_\_\_ Personal reasons.
- G. \_\_\_ Other reasons. Please describe \_\_\_\_\_.

How did you find out about our program?

- A. Mailings (Department's poster and postcards)
- B. Guides to graduate education/departments (Peterson's Guide, AGI, etc.)
- C. Internet website
- D. Word of mouth (recommended by friends and/or faculty)
- E. Undergraduate degree from this department.
- F. Undergraduate degree from another department of this university
- G. Others \_\_\_\_\_.

Your immediate career goal is:

*a professional position*

*a sub-professional position*

*advanced (MS/PhD) degree program in geological sciences at other universities.*

*teacher training programs*

*other degree (e.g. MBA, LLD) programs.*

*none or not sure.*

*Others. Please specify \_\_\_\_\_.*

Your long-term career goal is: \_\_\_\_\_

\_\_\_\_\_

In your opinion, what was the most formidable difficulty that you had to overcome?

\_\_\_\_\_

\_\_\_\_\_

Please respond to the following statements by indicating your agreement or disagreement on a scale of 1 (strongly disagree) to 10 (strongly agree).

## GENERAL ENVIRONMENT

*University*

The university campus provides a friendly and supportive environment for undergraduate students.

1    2    3    4    5    6    7    8    9    10

The library collection and service are adequate for my undergraduate work.

1 2 3 4 5 6 7 8 9 10

The university provides adequate supporting facilities (health, counseling, food, dormitory, etc) for undergraduate life.

1 2 3 4 5 6 7 8 9 10

*Off-Campus*

The Fresno area provides a reasonable social environment for my stay.

1 2 3 4 5 6 7 8 9 10

Social life on and off campus has been wonderful.

1 2 3 4 5 6 7 8 9 10

Housing in the area is reasonable and adequate.

1 2 3 4 5 6 7 8 9 10

## FINANCIAL SUPPORT

Part-time or full-time employments are readily available to supplement my financial needs.

1 2 3 4 5 6 7 8 9 10

The university provides reasonable financial support through scholarships and assistantships.

1 2 3 4 5 6 7 8 9 10

## PROGRAM

I was able to obtain instruction (courses) in subjects that I am interested in.

1 2 3 4 5 6 7 8 9 10

I was able to obtain instruction (courses) that I need to advance my future career.

1    2    3    4    5    6    7    8    9    10

The level of instruction that I received was generally appropriate for the level of the degree program.

1    2    3    4    5    6    7    8    9    10

The amount of work required for the degree is appropriate for the degree that I sought.

1    2    3    4    5    6    7    8    9    10

The program in general met my expectation.

1    2    3    4    5    6    7    8    9    10

I was able to obtain the knowledge and training from the courses that will help me advance my career objective.

1    2    3    4    5    6    7    8    9    10

I was able to obtain additional courses in related areas from other departments.

1    2    3    4    5    6    7    8    9    10

## **FACULTY**

The size of the faculty is just right.

1    2    3    4    5    6    7    8    9    10

I was intellectually challenged by the teaching of the faculty.

1    2    3    4    5    6    7    8    9    10

The length of time required for my degree is reasonable.

1    2    3    4    5    6    7    8    9    10

The faculty of the department is active and up-to-date in their fields of expertise.

1    2    3    4    5    6    7    8    9    10

The faculty is generally reasonably competent undergraduate level instructors.

1    2    3    4    5    6    7    8    9    10

My advisor is a good mentor.

1    2    3    4    5    6    7    8    9    10

## DEPARTMENT

The staff of the Department is friendly and helpful.

1    2    3    4    5    6    7    8    9    10

The students in the Department are generally friendly and helpful.

1    2    3    4    5    6    7    8    9    10

The instructional facilities of the Department are adequate and well maintained.

1    2    3    4    5    6    7    8    9    10

The research facilities of the Department are adequate and well maintained.

1    2    3    4    5    6    7    8    9    10

On a scale of 1 to 10 (1 for the worst; 10 for the best), your over-all ranking of your graduate education experience is:

1    2    3    4    5    6    7    8    9    10

**OTHER COMMENTS:**

(Please be specific).

## APPENDIX B

### Results of Student Outcomes Assessment

Assessment activities in the SOAP are divided into indirect and direct measures of student learning. Indirect measures include the Senior Exit Survey, Pipeline Analysis, and Alumni Survey. Direct measures include application of the Scientific Writing (Geology 104) and Advanced Field Methods (Geology 107) scoring rubrics.

**Senior Exit Survey:** Graduating seniors are asked to fill out a survey. From 2002-2005, eight students responded to this request. Responses are summarized below:

- Students identified research and instructional facilities in need of improvement.
- Five students worked part-time or full-time off campus while in the Geology program.
- When asked why they selected the CSUF Geology program, five identified the location of the University as a primary factor in their consideration. Other primary reasons included program content and financial considerations. Secondary reasons for enrolling included financial considerations and program content.
- Half of the students learned about the CSUF Geology program by word of mouth. The other half learned about the program by various means; internet, taking a GE class in Geology, directly inquiring about the program.
- Six students identified their immediate career goal upon graduating as obtaining a professional position. The other two intend to pursue advanced degrees.
- The long-term goal of all but one is to be employed as a professional. One graduate would like to teach at a junior college.
- Various responses are given when asked about the most formidable obstacle to graduating. Half listed financial obstacles. Two cited balancing family, studies and work. The other two listed course work, such as learning chemistry, the summer field course, and GE classes.

**Pipeline Analysis:** This assessment method was first implemented with students entering the department programs in Fall 2002. Due to the low number of majors entering the program, we were not generating meaningful data and so we suspended this assessment activity during Fall 2004. The limited data generated by the analysis merely confirmed what we already knew. On average, approximately half of our majors enter at the Freshman level, while the other half are transfer students. Transfer students more typically take courses out of sequence in the major, which may be negatively impacting student performance and time to graduation. Students leaving the program before graduation cite various reasons, but most frequently they include change of career interests and financial considerations (e.g. leaving school to return to full-time work to support a family, etc.).

**Geology 104 (Scientific Writing) scoring rubrics:** The Scientific Writing Final Report scoring rubric and Oral Presentation scoring rubric were implemented for the first time during Fall 2002. The rubrics are designed to evaluate the writing and oral presentation skills of senior undergraduates. The sample size was six students. Student performance varied widely in the evaluation of writing skills. There was one common problem area among the students; poor

editing. While exercises in Geology 104, 106, and 107 already strive to improve students' editing skills, additional effort will be made in Geology 104 to assist students in further developing their editorial abilities by introducing new exercises relating to peer editing and self-editing. Overall, students performed well on the Oral Presentation. Requiring students to do additional professional oral presentations in other major courses would enhance their oral skills.

**Geology 107 (Advanced Field Methods) geologic map scoring rubric:** During Spring 2002, prior to formal implementation of the SOAP, the geologic map scoring rubric was tested. The rubric is designed to evaluate the geologic mapping skills of senior undergraduates. The Spring 2002 Geology 107 class size was four students. Overall, the students performed very well. No significant deficiencies in skills were identified. There were a couple of areas identified for attention, including map presentation and precision and accuracy of mapping contacts between stratigraphic units, but these were relatively minor.

**Alumni Survey:** In May 2004 we mailed a survey to all alumni having graduated since 1990. Only three students responded. The survey is included as Appendix X. The responses are summarized as follows:

- Years of graduation are 1990, 2000, 2003.
- All three are employed full-time as a professional geologist or in a closely related field.
- The year 2000 & 2003 graduates identified their education in the CSUF Geology program as 'essential' to their career success. The 1990 graduate found the program to be 'useful.'
- All three identified their education in the CSUF Geology program as 'essential' in acquiring their first full-time job following graduation.
- None of the three went on to attend graduate school.
- In commenting on parts of the program that were particularly helpful in their professional career, the respondents mainly identified skills, rather than particularly courses. Developing skills related to observation, analysis, interpretation and communication (written and oral) were most significant.
- In commenting on parts of the program that the department might consider modifying to better prepare future students for professional careers, each respondent had different suggestions. One suggested requiring a GIS course. For individuals intending to remain in the Central Valley, one alumnus would like to see more applied geology courses involving hydrogeology, remediation, geotechnical engineering and perhaps even a geologically related office skills class.

The Department organized a very successful alumni reunion event in the Spring 2006 semester. As part of this activity, data regarding the career development of a self-reporting segment of the Department's graduate provided employment data, summarized below in Fig. 1.

Of the 125 graduates included in this survey, fully 68% gained employment in geology-related fields, or are presently enrolled in graduate studies. Only 4% of this sample work in fields not related to geology, but we have no data for 22% of respondents. It is clear from Figure 1 that 46% of our graduates find employment in the consulting/engineering field, by far the single largest category of employment. 14% find employment in government agencies, including local, state and federal agencies.

## **Employer Survey & Student Performance Appraisal**

The Department will conduct an Employer Survey and a Student Performance Appraisal during the Spring 2007 semester.