

Geology and Geophysics
Status of Assessment Efforts
Academic Year 2004-2005

This memo is in response to your request of July 8, 2005 for information on the status of our efforts to assess undergraduate learning in the Department of Geology and Geophysics in preparation for the WASC progress report September 9, 2005.

A. Undergraduate Assessment

1. Student Learning Outcomes for undergraduate majors in the Department of Geology and Geophysics are:
 - a. To acquire knowledge and understanding of the basic principles of geology and geophysics, including the ways in which Earth responds to internal and external forces, the interactions of the solid Earth with the hydrosphere, atmosphere, and biosphere, how these responses and interactions affect humankind and the environment, and Earth's tectonic and geochemical processes and cycles.
 - b. To understand the importance and limits of geological inquiry through the history of discoveries and ideas that contribute to our current awareness of Earth and its past, with examples that have had substantial social, economic, and cultural impact.
 - c. To acquire knowledge and understanding of the basic principles of physics, chemistry, biology, and mathematics in their application to the processes and materials of Earth and the planetary system.
 - d. To acquire knowledge and understanding of the fundamental tenants of geological subdisciplines including geophysics, geochemistry, geobiology, mineralogy, petrology, structural geology, historical geology, sedimentology, and stratigraphy, and how plate tectonics provides a paradigm for how these sub-disciplines are related.
 - e. To be able to:
 - map and interpret in the field a diverse variety of rock types and structures,
 - use laboratory equipment and techniques to observe and measure phenomena, and apply scientific principles, to aid understanding of geological materials and processes,
 - use computers to analyze geologic data.
 - f. To acquire knowledge and understanding of the application of Earth Science to human needs, and of Earth Science appropriate to Hawaii's geographic setting.
 - g. To design with a mentor, conduct, and present an investigation that uses one or more methods of field, laboratory, library-scholarship, and data-base research.
 - h. To read and be able to analyze scientific papers critically.

i. To present geological information clearly in both written and oral form.

The extent to which these objectives apply will differ somewhat between the BA degree in Geology and the BS degree in Geology and Geophysics.

2. These SLOs are published in our Undergraduate Survival Guide and on the Departmental Web Site: www.soest.hawaii.edu/GG
3. The SLOs map directly onto our curriculum, which has a core of 12 courses and 18 possible electives. These courses combine classroom, laboratory and field experiences to provide a substantial grounding in the basics of our science as listed above. All students are required to take our two capstone courses that bring together the learning outcomes of the core and elective courses.

4. Methodologies of data collection

a. Dates of Assessment activities

	Assessment Instrument	Status
--	Setting of Dept. Objectives	Prepared in Spring 2001.
1	Questionnaire at entrance to major	In use since Fall, 2001.
2	Class evaluation forms	In use for many years. Revised Fall, 2001. New forms introduced in classes in Spring 2002.
3	Exit from major evaluation (capstone)*	See current GG305 syllabus
4	Alumni Survey	First survey completed in Fall 2001. Done for graduates of 1999-2000.
5	Employer survey	First survey completed in Fall 2001.

b. Populations covered

1	Questionnaire at entrance to major	All majors at the junior level
2	Class evaluation forms	All students
3	Exit from major evaluation (Capstone course)	All majors
4	Alumni Survey	Matriculated majors of 1999-2000
5	Employer survey	Alumni (as seen by local employers)

c. Aspects of programs that were assessed

1	Questionnaire at entrance to major	<ul style="list-style-type: none"> • Intent and expectations of incoming majors
2	Class evaluation forms	<ul style="list-style-type: none"> • Quality of instruction / instructor performance • Fairness • Student effort • Course value • Course relevance in terms of career objectives • Recommendations for course modification
3	Exit from major evaluation (Capstone course)	<ul style="list-style-type: none"> • This course is currently under review to decide the nature of any changes that might be necessary to help it function better as a capstone course. The department is also reviewing how to formally assess the course in the context of a capstone course.
4	Alumni Survey	<ul style="list-style-type: none"> • Relevance of degree to current position • Rating of alumni abilities for 10 skills • Importance of these skills are to current career activity • Level of satisfaction with their preparation at UHM for each skill • Strengths and weaknesses of the department • Courses that should be added as electives or requirements • Other training they needed or wanted from the department or University
5	Employer survey	<ul style="list-style-type: none"> • Relevance of current undergraduate courses to employers • Preparation of GG majors • Interest in developing a closer relationship with our department

d. Type of instrument or data-gathering approach

1	Questionnaire at entrance to major
2	Class evaluation forms
3	Exit from major evaluation (Capstone course)*
4	Alumni Survey
5	Employer survey

e. Response rates

	Assessment Instrument	Responses	Response rate
1	Questionnaire at entrance to major	50/50	100%

2	Class evaluation forms	Several hundred	Average 82%
3	Exit from major evaluation (Capstone course)*	5 semesters worth*	100%*
4	Alumni survey	12/15	80%
5	Survey of local employers	27/51	53%

* All majors are required to take this course

5. The assessment data were used in the following ways:

- a. The department has established our field methods course – GG305 as one of two capstone courses for our undergraduate majors. Students, in their course evaluations, have rated both the instructor and the course as among the best in the department. We have established an alumni fund dedicated toward offsetting the cost of the mainland portion of this course (over Spring Break) for our majors. See GG305 syllabus below.
- b. Our second capstone course is GG 410/610 in which undergraduates present talks on research subjects and are evaluated on presentation style. The course meets once a week with graduate students and meets once a week with undergraduates only. This exposes undergraduates to active research topics within our department and allows them to pursue in-depth aspects of their own interests. This course now qualifies under the “oral” O - focus designation on campus.
- c. The department has proposed an internship course to enhance local employment opportunities after graduation.
- d. We have introduced a lower division course on Matlab programming for science majors, a course the university does not now offer.
- e. The department brings in locally employed alumni or local employers for informal lunchtime talks with our undergraduate majors.
- f. The department has implemented a weekly seminar expressly for undergraduates in which faculty members describe some of their current research and opportunities for undergraduates to become involved.
- g. The department is participating in a SOEST initiative to map Hawaii at high resolution and accuracy using GPS equipment, with stipends provided to students who participate.
- h. We have established two department undergraduate advisors that meet with every Geology major each semester to plan and implement the most efficient pathway to graduation. We also have a dedicated Student Services Specialist who sees to the solution of undergraduate problems and program implementation.
- i. Undergraduates have an “Undergraduate Survival Manual” available for their use that outlines all necessary steps to achieving our offered degrees and provides guidance on all aspects of undergraduate life in our department. This and other department documents are available for downloading from a public website.

6. General Education Assessment Within the Major:

All of the GE requirements are covered by our Major requirements as stated above.

GG 305, FIELD METHODS (Writing Intensive), Spring Semester 2005

Scott Rowland

(POST 623, 956-3150, scott@higp.hawaii.edu)

TIME: Fridays 11:30-12:20, POST 708, Saturdays 8:00-4:00, IN THE FIELD!

TENTATIVE SCHEDULE

Jan. 18	Fri	Introduction, requirements, purpose, equipment
Jan 19	Sat	<i>Pace and compass mapping, use of Brunton</i>
Jan 25	Fri	Topo maps, geologic maps, cross-sections
Jan 26	Sat	<i>Locating yourself in the field, Makapu'u leveling and filled lava tube</i>
Feb 1	Fri	Field notes, reports, and photographs
Feb 2	Sat	<i>Stratigraphic section at Makapu'u</i>
Feb 8	Fri	GPS
Feb 9	Sat	<i>Start Hanauma Bay mapping project</i>
Feb 15	Fri	Air photo interpretation
Feb 16	Sat	<i>Continue Hanauma Bay mapping project</i>
Feb 22	Fri	Creating maps and diagrams (by SOEST Pubs)
Feb 23	Sat	<i>Continue Hanauma Bay mapping project</i>
Mar 1	Fri	Free day (Scott on Kaho'olawe)
Mar 2	Sat	<i>Continue Hanauma Bay mapping project (Scott on Kaho'olawe)</i>
Mar 8	Fri	Geological maps homework, <u>Hanauma Bay first draft due</u>
Mar 9	Sat	<i>Rock Identification practice I, hand samples</i>
Mar 15	Fri	no class (Scott in Houston)
Mar 16	Sat	<i>Rock Identification practice II, thin sections, Hanauma Bay first drafts</i>
returned		
Mar 21	Thu	<i>California trip starts</i>
Apr 1	Mon	<i>California trip pau</i>
Apr 5	Fri	Hawaiian Caldera intro
Apr 6	Sat	<i>Wai'anae mapping project</i>
Apr 12	Fri	Work on California and Big Island projects (Scott on Big Island)
Apr 13	Sat	<i>Work on California and Big Island projects (Scott on Big Island)</i>
Apr 19	Fri	SOEST Open House, <u>Hanauma Bay project due</u> (no class)
Apr 20	Sat	<i>SOEST Open House (no class)</i>
Apr 26	Fri	<u>California project first draft due</u> , Intro to pyroclastic mapping
Apr 27	Sat	<i>Tantalus deposit mapping</i>
May 3	Fri	Work on California project
May 4	Sat	<u>Work on California project</u>
May 8	Wed	<u>California projects due</u> (no final exam !!)

There is no text for this course. There will be handouts and occasional reading assignments from books on reserve at the SOEST library, specifically Field Geology Illustrated by Terry Maley, and Manual of Field Geology by Robert R. Compton (a classic, now out of print, that you should snatch up if you ever see a copy). You might also want to dust off your old Intro. Geology lab manual, and your Mineralogy and Structural Geology notes.

Individual Saturday and smaller, in-class projects are due at the start of the following class. Hanauma Bay and California assignments must be turned in on the dates indicated. In all cases late projects will suffer severe point reductions.

For safety in the field, you are encouraged to work in pairs or groups of 3. However, each student must turn in their own individual maps, cross-sections, and reports.

Grading will be weighted towards the large projects (Hanauma Bay and California), with the smaller, one-day projects and homework counting for less. Note that because this is a Writing-Intensive course you will be required to turn in rough drafts of the two largest projects; these rough drafts will count as part of your score for these projects. I will make comments on the rough drafts and hand them back with enough time for you to revise your final versions.

There are no exams.

<u>ASSIGNMENT</u>	<u>% TOTAL GRADE</u>
1-day projects	30
Hanauma Bay (report, maps, sections, interpretation)	20
California (3 exercises)	40
Homework	10

The grade on all assignments, regardless of size, will be depend on the following:

-accuracy of work	25%
-amount of detail	25%
-validity of interpretation	25%
-presentation/neatness	25%

A. Graduate Assessment

1. Student Learning Outcomes for graduate degrees in the Department of Geology and Geophysics are:

All graduate students in Geology and Geophysics who have successfully completed the degree program should be able to:

1. Demonstrate mastery of the methodology and techniques specific to the field of study.
2. Communicate both orally and in writing at a high level of proficiency in the field of study.
3. Conduct research or produce some other form of creative work.
4. Function as a professional in the discipline.

Masters and Doctoral programs in Geology and Geophysics are focused primarily on learning advanced methodologies and critical thinking by conducting focused research, supplemented by specialized elective course work in numerous topical areas. Degree programs are centered around one of 3 broad disciplinary cores that foster research reflecting the inter-disciplinary nature of the GG department and SOEST in general (geophysics and tectonics, marine and environmental geology, and volcanology/geochemistry/petrology). In addition, GG degrees focusing on planetary geology and mineral physics may be perused in conjunction with advisors in HIGP.

2. The SLOs are published on our departmental web site (www.soest.hawaii.edu/GG) as well as in our Graduate Survival Guide.
3. The SLOs are achieved by a combination of course, field and laboratory work, and thesis/dissertation research.
4. All graduate students are covered by our assessments.
5. Assessment events:
 - a. Department policy requires that a graduate student meet with their thesis/dissertation committee every semester for the goal of reviewing progress and seeking guidance. Extenuating circumstances may prevent a timely and expeditious meeting. In this case, a student is expected to make every effort to communicate with committee members in lieu of a physical meeting such that the goal of this policy is fulfilled.
 - b. All graduate students are evaluated annually in mid-spring. This evaluation of progress will include a written statement of progress/problems from the student, an interview of the student by members of the GSC. The student's advisor or committee chairman, and his or her employer (if any) will *not* be present at the oral evaluation, although they will complete written evaluations. Members of the GSC will review and evaluate the student's plan of study and progress. All evaluators will report their opinions to the GSC and the department chair, including how deserving of financial aid and office space each student is for the following year. Suggestions from students for departmental improvements are strongly encouraged during the interview. The results of the spring evaluation become part of the student's file.
 - c. Ph.D. students who enter our program without a Master's degree are required to take a Qualifying Examination. The purpose of the qualifying examination is to determine whether or not a student with a bachelor's degree meets the academic standards of the department for

direct entry into the PhD program without completing an MS degree. For students entering with an MS degree and thesis in the sciences the qualifying examination is waived. This examination is designed to evaluate the student's ability to conduct research. The qualifying examination, normally held at the end of the student's first full year in the program (for students entering in the fall no later than the following September and for students entering in the spring no later than the following February), is required of all students entering with a bachelor's degree who wish to be considered for the PhD rather than the MS program.

The examination will be either the presentation of results of a research project or a research proposal, intended to demonstrate the student's ability to conduct PhD-level research. Two alternative types of presentation will be allowed: (1) an original research project (which may be an expansion of the student's undergraduate honor's thesis or other undergraduate research), or (2) a proposal for an original research project. Either (1) or (2) may lead on to the topic of the dissertation, but need not do so. The final product to be judged by the qualifying examination committee will consist of:

Option 1: a written description of the research methods, procedures, results, bibliography, etc. of approximately 10-12 pages (a published paper for which the student is first author may substitute for the written description), or

Option 2: a written research proposal.

In either case there also will be an oral presentation of approximately one-half hour, to be followed by questions. A committee of at least three graduate faculty, including the student's advisor (or interim advisor) and at least one member of the GSC, evaluates the qualifying examination. If the student's performance on the qualifying examination is judged by the committee to be acceptable for entry directly into the PhD program, the student will be admitted to PhD candidacy if the student so desires; if the performance is deemed not acceptable by the committee, the student will be required to complete the MS degree before receiving further consideration for entry into the PhD program.

- d. All Ph.D. students must take a comprehensive examination. The comprehensive examination in the Department of Geology and Geophysics determines the depth of the candidate's knowledge in his or her special fields and the breadth of his or her knowledge in fields related to the dissertation and to the geological sciences. Results indicate to the department whether or not the candidate has a sufficiently firm and broad foundation on which to build a career of independent research, college-level instruction, or both. The comprehensive examination is taken at or before the end of four semesters of residence in the PhD program. The examination covers "the major field of study and work fundamental thereto and minor fields as may be required" (GRADUATE DIVISION MANUAL). A date for taking the comprehensive examination will be determined in consultation with your advisor.

Examination Committee: Graduate Division states that the comprehensive examination will be conducted by "the graduate faculty or a subcommittee thereof". In the Department of Geology and Geophysics this subcommittee consists of at least five members, at least two must come from outside the student's Area of Interest (The Department of Geology and Geophysics currently recognizes four Areas of Interest: Geophysics and Tectonics; Marine and Environmental Geology; Volcanology, Petrology and Geochemistry; and Planetary

Geoscience and Remote Sensing – see University of Hawaii at Manoa catalog for detailed descriptions). The Examination Committee must be approved by the G&G Chair prior to the examination.

Scope: Examination topics include the PhD candidate's intended fields of specialization and allied subjects pertaining to the intended fields. The PhD candidate and advisor, in consultation with the rest of the committee, will decide upon the intended fields of specialization. These should be as broad in scope as possible while maintaining a focus on the candidate's PhD research topic.

It should be emphasized that specialized fields and allied subjects are not specific courses, but areas of expertise. Breadth and depth can be gained through coursework, using those courses listed in the Area Requirements as a guide, or by independent study, but usually are best gained by a combination of course work and additional reading.

The examination: The examination will have both written and oral sections. The format of comprehensive examinations is variable, but the committee must inform the student of the chosen format well in advance of the examination date. The oral part should follow the written part by a period of not more than one week. At least one faculty member who is a member of the GSC must attend the oral portion of comprehensive exams. If the student's examination committee does not include a member of the Graduate Studies Committee (GSC), a non-voting and non-participating GSC faculty will be appointed by the GSC chair to observe all parts of the oral portion of the comprehensive exam. For the examination itself, the rules of the Graduate Division prevail. All members of the committee must be present for the oral portion and all must participate in judging the result of the entire examination. By department rules, the judgment must be made at the end of the oral examination; an examination may not be "continued" at a later date.

Results: In order for the PhD candidate to pass the examination, a majority vote of pass is required from the committee. The committee chair is a voting member. A member voting in the minority may request a review by the Graduate Division Dean. Irrespective of a pass or fail result, the committee should use the results of the examination to indicate any outstanding deficiencies in the candidate's preparation for the intended doctoral research and to request or require courses or readings to satisfy that deficiency. Candidates who fail the examination may repeat it once and the doctoral examination committee shall decide which topics will be re-examined. Those who fail the second examination will be irrevocably dropped from the program.

- e. Students in the Master's Plan B (non-thesis) must submit an acceptable proposal to his/her committee explaining the academic focus of the MS, outlining what courses he/she plans to take, and specifying the type of research activity that he/she will participate in. A written research report is required. The topic must be approved by the student's entire committee. The finished report must be delivered to their committee at least one week prior to the oral exam. An oral exam covering the student's research report and general geologic knowledge is required. The student's entire committee must attend. Other faculty may attend. Only the student's committee votes.
- f. All graduate students in the thesis/dissertation program must write and defend a thesis/dissertation proposal.
- g. All graduate students must present a public defense of their thesis or dissertation.

- h. Effective Spring 2005, all graduate students in Geology and Geophysics will be required to participate in an exit interview prior to graduation. The Graduate Division's Student Progress Form III will be signed by the GG graduate chair only upon completion of the exit interview. Interviews will not be conducted by faculty members.
6. Our graduate students routinely present talks/posters at the annual meetings of the Geological Society of American and the American Geophysical Union. In addition, many attend other international conferences and present their research results. Our graduate students have traditionally published their thesis/dissertation research in international journals.
7. The Geology and Geophysics Department maintains a mailing list of its graduates. We send them copies of our Newsletters and ask them to keep us informed of their professional activities.
8. We have used the assessment data to improve communications with our graduate students. Our semester and yearly evaluations were instituted to monitor student progress and to give our students the opportunity for feed-back to the faculty. Our graduate degree programs are tailored to each individual student in terms of type of degree, course work, committee members, advisors and research topics, so changes/modifications to the program can occur as often as necessary.