Proposal for a New Degree Program:
“MGeo” Professional Master of Geoscience

Department of Geology and Geophysics
School of Ocean and Earth Science and Technology

University of Hawai‘i at Mānoa

March 2012
Proposal for a Master of Geoscience (MGeo)

Administrative Locus

School of Ocean and Earth Science and Technology (SOEST)

Planning Committee

Garrett Apuzen-Ito
Neil Frazer
Gregory Ravizza
Stephen J. Martel
Aly El Kadi
Gregory Moore

Department of Geology and Geophysics
Department of Geology and Geophysics
Department of Geology and Geophysics
Department of Geology and Geophysics
Department Chair and Graduate Chair of Geology and Geophysics

Degree Proposed

MGeo, Professional Master of Geoscience

Proposed Date of Implementation

Fall 2013
Proposal for a Master of Geoscience (MGeo)

Table of Contents

1. Executive Summary .................................................................................................................. 1
2. Background ............................................................................................................................... 2
3. Program Need and Justification ............................................................................................... 3
   3.1 What Geoscientists Do ......................................................................................................... 3
   3.2 Projected Growing Demand for Geoscientists in the U.S. and Hawai‘i ............................ 4
   3.3 Growth in Professional Master’s Degrees in Science ......................................................... 7
   3.4 Feedback from GG Alumni from Informal Market Survey .............................................. 7
   3.5 Summary of Results of Survey of Current GG Undergraduate Majors ......................... 8
4. Statement of Program Objectives ............................................................................................ 10
5. MGeo Program Description ..................................................................................................... 10
   5.1 Target Market ..................................................................................................................... 10
   5.2 Distinguishing Features ...................................................................................................... 11
   5.3 Admissions Requirements ................................................................................................. 11
   5.4 Course Requirements ........................................................................................................ 12
   5.5 Writing Course Requirement ............................................................................................. 13
   5.6 Work Project and Culminating Experience ....................................................................... 13
   5.7 Program Administration .................................................................................................... 14
   5.8 Student Advising ............................................................................................................... 14
6. Relationship to Board of Regents Criteria ............................................................................. 14
7. Relationship to Other Programs at UHM ............................................................................. 15
8. Similar Programs at Comparable Institutions ...................................................................... 16
9. Resources Required and Resources Available ....................................................................... 17
10. Financial Projections (anticipated enrollment and costs) .................................................. 19
11. Assessment of Student Performance and Program Effectiveness ...................................... 21
Appendix 1: Course Proposals for GG740 MGeo Seminar and GG750 MGeo Professional Project 23
Appendix 2: Feedback from Alumni .......................................................................................... 34
Appendix 3: Survey of Current Undergraduate Majors ............................................................ 47
Appendix 4: Executed ATP .......................................................................................................... 80
1. Executive Summary

The Department of Geology and Geophysics (GG) proposes to create the “MGeo”, Masters of Geoscience, a professional Master’s degree program for students who seek careers in geoscience-related industries. Evidence shows that there is a population of students at UH and working professionals on Oahu who would benefit from many GG course offerings, but who do not enroll because our current graduate degree tracks (M.S., Ph.D.) cater almost exclusively to students seeking training in basic research and who are supported by faculty research grants. Unlike the M.S. degree, the MGeo will emphasize coursework in applied geology and geophysics and provide options for training in business, economics, and management. Rather than a research thesis, MGeo students will do a work project as a volunteer, intern, or as an employee of a local company or agency, followed by a written report and oral presentation. For individuals with a B.S. in geology and geophysics, the MGeo will be an efficient path to a Master’s degree as it can be completed with only one additional year of study. For students with other science backgrounds, such as in civil engineering, environmental engineering, and agriculture and resource management, the MGeo will provide advanced training for pursuit of geoscience related careers. In addition, courses will be scheduled appropriately or given online to make the MGeo available to working professionals.

The MGeo degree will support the University of Hawai‘i’s mission of fostering a skilled workforce in areas of growing importance to Hawai‘i and the global economy. These areas include environment (e.g., consulting, remediation, water resources, beach erosion, and climate change); natural hazards (mitigation and adaptation due to floods, tsunamis, earthquakes, landslides, volcanic eruptions), energy and natural resources (petroleum and gas exploration and development, renewable energy, metal and mineral resources), and K-12 education. While other degree programs at UHM may also feed into some of the above employment sectors (e.g., M.S. in Civil Engineering, M.S. in Natural Resources and Environmental Management), the MGeo degree is distinct in its specialization in geological and geophysical applications, and in emphasizing a work project. MGeo will directly support UHM’s goals of “increasing the experiential learning opportunities”, “increasing student success”, of “promoting scholarly work that informs policies and practices that benefit communities”, to “expand internships, practice, mentoring”, and to “increase partnerships and sharing of expertise with community organizations”.

The MGeo will be marketed as a professional degree program that is distinct from the current M.S. degree. Students will pay tuition to obtain the MGeo degree; therefore the enrollment of the program will not be limited by extramural funding as it is in our M.S. program. GG’s graduate program will benefit because the MGeo students will augment the sizes of graduate classes, add diversity to the graduate student population, and support more regular interaction between GG and local industries. The MGeo program will leverage existing GG/SOEST resources: no new faculty members are needed; only two new courses will be developed; and few additional offerings of existing classes will be required. The program will be self-sustaining in that the added work required of GG faculty or added lectureships by local professionals will be funded by the tuition raised.
2. Background

Geology has a long history within the University of Hawai‘i at Mānoa (UHM), having been taught since 1920, organized into a department in 1955, and then given the name Geology and Geophysics in 1959. The graduate degree program began in 1962. The department currently offers four degrees:

- B.S. in Geology & Geophysics (for students planning to be professionals)
- B.A. in Geology (for students not planning to become professional geoscientists)
- M.S. in Geology and Geophysics (Plan A requires a research thesis and Plan B is the non-thesis option)
- Ph.D. in Geology and Geophysics

The Department of Geology and Geophysics (GG) has an internationally recognized strength in basic research. The expertise of its 26 full time faculty members is broadly categorized by the names of the three main divisions: Geophysics and Tectonics (GT), Marine and Environmental Geology (MEG), and Volcanology, Geochemistry, and Petrology (VGP). On average, each faculty member typically produces 3-4 peer-reviewed scientific journal publications per year, and the department collectively has raised an average of about $3M per year in extramural research funds in the past decade. Correspondingly, the current graduate program has emphasized basic research with the M.S. Plan A requiring a research thesis and the Ph.D., a research dissertation. M.S. Plan B is a non-thesis option but only 3 students have taken this option in the past decade.

Recent enrollment of GG’s degree program is shown above. While the numbers are smaller than those of many programs at UHM, the size of GG’s program is appropriate when considering the broader U.S. market: the percentage of all UHM students in GG of 0.4% is larger than the percentage of all U.S. undergraduate and graduate students in the geosciences of 0.15% (i.e., 30,000 graduate and undergraduate geoscience majors in the past decade [AGI, Geoscience Currents, No. 31, 27 April 2010] compared to ~200,000 total U.S. students [http://www.census.gov/hhes/school/data/cps/2010/tables.html]). In terms of GG’s graduate program, the size is primarily controlled by the fact that essen-
tially all graduate students are supported by research assistantships (RAs). The RAs are funded from extramural grants and tied to specific projects of individual faculty members who are the primary advisors of the students. This practice is standard in the geosciences across the country as it is in other scientific fields supported by national funding agencies.

The system of limiting enrollment based on extramurally funding works well for GG’s research program and for students interested in pursuing research as a career; however, the system is a disadvantage to GG’s broader mission of serving a range of education needs both in and outside of research. GG’s existing course program has the capacity to train more students. In addition, the time needed for a student to conduct a successful M.S. research project is the primary controlling factor on the duration of the degree and it has led to most M.S. degrees taking two or more years. The MGeo is aimed to improve GG’s graduate program by overcoming the above limitations. An important requirement is that the MGeo students pay tuition and be ineligible for research and teaching assistantships. This practice is common among many professional degree programs and is one reason the MGeo will be identified and marketed as entirely separate degree program. Ultimately, the MGeo will augment GG’s graduate program with a more diverse student body, serve a broader sector of Hawai‘i’s workforce, provide additional tuition income, and help meet a rising number of geoscience-related occupations locally and nationally.

3. Program Need and Justification

3.1 What Geoscientists Do

Geoscientists—as described by the U.S. Bureau of Labor Statistics (BSL, http://www.bls.gov/oco/ocos312.htm)—“study and work in one of several closely related geoscience fields, including geology, geophysics, and hydrology”. Geology and geophysics involves the study of the composition, structure, dynamic processes and history of the Earth. Geologists traditionally characterize and map rock formations to determine their origin and evolution. Subspecialties include petroleum geologists who specialize in petroleum exploration; engineering geologists who “apply geological principles to the fields of civil and environmental engineering, offering advice on major construction projects and assisting in environmental remediation and natural hazard-reduction projects”; mineralogists who specialize in mineral analysis, classification, and exploration; sedimentologists who “study the nature, origin, distribution, and alteration of sediments” as well as sedimentary rocks, which contain oil, gas, coal, and other mineral deposits; and geochemists who study the origin and evolution of rocks and water based on their chemical composition. Geophysicists apply physics, math, and techniques involving seismology, gravity, magnetics, and electromagnetics to studying the surficial and internal structure of the Earth. “Hydrologists study the quantity, distribution, circulation, and physical” (and chemical) “properties of water and the water cycle”.

Hence geoscientists play major roles in the interaction of society with the Earth, whether it be in construction, natural hazard mitigation, preserving fertile soil for agriculture, the search for ever diminishing mineral and petroleum resources, securing clean water supplies, or developing new technologies for renewable energy. These activities address some of the biggest challenges the U.S. and the world face in the near to distant future.
3.2 Projected Growing Demand for Geoscientists in the U.S. and Hawai’i

The demand for geoscientists in the U.S. workforce is projected by the BLS Occupational Outlook Handbook (2011) to grow between the years 2008-2018 by 18%, substantially more than the average of all occupations (http://www.bls.gov/oco/ocos312.htm). The growth of geoscience professions is expected to be spurred by the needs for energy, environmental protection, hazards mitigation, as well as land and water management. For example, an increasing number of geoscientists are working in environmental management. Geoscientists and hydrologists are needed to monitor the human impact on coastal environments and on soil and water contamination. More engineering geologists are expected to be needed for large construction and infrastructure projects such as highway building. In the specialties of oil, gas, and coal exploration, the employment of geoscientists has fluctuated considerably with the prices of these commodities; however, a long-term trend of rising oil prices is expected to maintain a high demand for geoscientists. In addition, as much of the U.S. population occupies more environmentally sensitive locations such as coastal regions, more hydrologists and geoscientists are expected to be needed to assess building sites for potential geologic hazards and to mitigate the effects of hazards such as landslides, floods, and tsunamis.

The projected national growth by industry sector is given in the two diagrams above.
Proposal for a Professional Master of Geoscience (MGeo)

In Hawai‘i, geoscience job growth from 2008-2018 is projected to be 10%. This growth is nearly twice the average growth percentage of all jobs in the State of Hawai‘i in that time frame [Hawai‘i, Dept. of Labor and Industrial Relations, Long-term Projections, Sept. 2011. www.hiwi.org].

In addition to the demand expected from growth of industry sectors, the demand for geoscientists in the U.S. will be further bolstered by the need to replace those who will move to senior management positions as well as those who will retire. The American Geological Institute’s (AGI) Geoscience Workforce Report 2009 [http://www.agiweb.org/workforce/data.html] shows that the majority of geologists and geophysicists are within 15 years of retirement age.

![Geoscientist Age Demographics by Membership Society (2008)](image)

Thus, even with “approximately 1,500 geoscience graduate students transitioning into the professional workplace each year, the supply of newly trained geoscientists falls short of geoscience workforce demand and replacement needs” [http://www.agiweb.org/workforce/data.html].

In the gas and oil industry, AGI shows that the projected enrollment of students in geosciences is expected to fall short of demand for the next 20 years.
"Even with an optimistic 3 percent increase in graduate geoscience students entering the petroleum industry and a conservative estimate of 2 percent growth in annual demand for geoscientists after 2011, by 2030, the unmet demand for geoscientists in the petroleum industry will be approximately 30,000" [http://www.agiweb.org/workforce/data.html]. Adding the anticipated supply of geoscience graduates from non-U.S. degree programs does not appreciably narrow the gap.

In public education, a growing number of geosciences departments nationwide are taking larger roles in supporting K-12 education [Nyman and Ellmein, EOS, Trans. AGU, 89(50), 2008]. Hawai‘i is expected to need 90 additional math and science teachers at the post-secondary level, a growth of 9% [Hawai‘i, Dept. of Labor and Industrial Relations, Long-term Projections, Sept. 2011. www.bat.org]. Professional degrees in science will help strengthen the quality of educators to meet this expected demand. Geoscience is one of a few areas of study that involves integrating a number of fundamental disciplines (chemistry, mathematics, physics, and biology); therefore an educator with a Master’s degree in geoscience will be well equipped to teach a variety of science courses in addition to those in earth and environmental science.

Also reflecting the strong demand and positive job outlook is the steady rise in salaries for geoscientists. Over the past decade, the average salary of geoscience-related occupations has increased more than those of physicists, chemists, and biological scientists (see diagram to the right). In the year 2010, the average annual salaries for geoscience-related occupations ranged from $60K-$130K.
3.3 Growth in Professional Master’s Degrees in Science

The need for stronger Master’s degree programs is supported by the BSL’s 2008-18 projections for employer demand. Employment of those with Master’s degrees in general, is projected to grow by about 18%, which is comparable to or slightly exceeds the demand for bachelor’s and doctoral degrees (17% each). This balance is not reflected in GG’s past enrollment which has seen fewer Master’s students than bachelor or Ph.D. students. Geoscientists with Master’s degree are often more highly desired by employees because they are better trained than bachelors and are not as specialized as most doctorates. The BSL report highlights geoscientists with Master’s degrees as having excellent job prospects (http://www.bls.gov/oco/ocos312.htm).

In the past decade or so an innovative Master’s degree program has arisen to support a growing career path for students interested in science but who do not want to pursue a Ph.D. or professional research [e.g., Teitelbaum and Cox, Nature 445, 2007]. The Professional Science Masters (PSM) initiative first began in 1997 when the Alfred P. Sloan Foundation provided grants to a select group of research universities to developed programs that integrated science and mathematics with training in management, law, and other professions. In 2001, the U.S. Council of Graduate Schools (CGS) extended the PSM to Master’s focused institutions. In 2006, CGS assumed primary responsibility from the Sloan Foundation for supporting and promoting the PSM initiative more broadly. Today, the PSM initiative recognizes 246 programs and 114 affiliate institutions throughout the U.S., Canada, Australia, and the UK (www.scientcemasters.com). The numbers have doubled since 2007. Hawai‘i is among 18 remaining states without such a program, but GG is well positioned to offer one.

3.4 Feedback from GG Alumni from Informal Market Survey

An informal market survey of our alumni revealed wide interest in the proposed MGeo program from individuals representing various companies, government agencies, and schools in Hawai‘i and other states. The complete email responses are given in the Appendix 1 but some of the responses are given below:

“I would say 90% of all non-academic geology jobs here in Hawai‘i are in the environmental field, yet UH doesn’t prepare their graduates with courses for this field of work. It makes no sense to me. Maybe this masters program will allow geology grads to focus more in this area to prepare them for the job market in Hawai‘i.” -Dave Davis ESN Pacific, Honolulu, HI
Proposal for a Professional Master of Geoscience (MGeo)

"As someone who pursued and received my MS in Geology & Geophysics there while working full-time as an Active Duty Army Officer, I say it sounds like a great plan! The late night research and hours in the labs killed me when I put on my uniform early every morning. If you need more than encouragement, let me know!" - LTC Joseph L. Ingignoli, Commander, 7th Squadron, 6th Cavalry (ATK HEL), Conroe, TX

"A Masters of Geoscience degree program would definitely draw interest from our firm’s staff. I can think of several people (4+) that would probably be interested in this program, including myself. Thanks for the opportunity to comment." - Scott Moncrief, Project Manager, CH2M

"The program sounds quite good - particularly in that the ‘culminating experience’ final project will be derived from the work place, tying together the practical and academic parts of the degree in a way that should benefit both the student and employer. I think if the program had been available at the time of my graduation I might have taken a job with a local firm and gone for it." - Eden Jael Feinstein, Dept. Hydrology & Water Resources, University of Arizona

"Currently, I work for the U.S. Geological Survey Water Resources Division in Honolulu. I have been an employee here since May 2005 under their Student Career Employment Program. The USGS and the university have a joint contract to employ me as a student until 2010. I would like to earn a professional degree with a focus on what I do here at the USGS, but do not know how to go about it or what the grand details are. ..." - Tracy Ibarra, USGS

"...When I returned three years ago I was disappointed in knowing that my only chance to do a Masters in Geology was to quit my job and go through a traditional MS program I dismissed the idea of going back to school." "... I am a middle school teacher but would love to take courses to keep current in the field to be a better teacher." Mahalo nui loa - Tina M. Mueller

"I think the MGEOS (Master’s degree in geosciences) is an excellent idea. There is a huge demand for people with various specialties and skills that also have backgrounds in earth science / geosciences. Typically companies find earth science people that they then train as analysis, CAD, GIS, Survey, env assessment, sampling & monitoring, businesses, law, etc...... I think a MGEOS degree would be a marketable degree and very desirable for professionals. Offering night courses opens the avenue to professional from many walks of life." - Greg Kuras, Seafloor Investigations LLC

3.5 Summary of Results of Survey of Current GG Undergraduate Majors

A package was sent to our current undergraduate majors containing information about salary and career trends in the geosciences, a summary of the MGeo program, as well as a short questionnaire (See Appendix 2). The five questions were designed to assess their future career interests and their potential interest in the MGeo degree:

1) Why did you decide to become a GG major, & how important was career consideration in your decision?

2) Yes or no: Are you seriously considering pursuing a career in the geosciences? If "no", how (if at all) has your experience as a GG major influenced your career interest. If "yes", what type of career in geosciences most interests you?

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. a) Not at all interested; b) Moderate-to-low interest.; c) Moderate-to high interest; d) Really, really interested. Please give a brief explanation for your choice:
5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested in geoscience related careers in industry but not research."

Out of 45 packages sent, we received 27 responses (60%). The breakdown of responses to question (4), about their interest in applying to the MGeo program are as follows:

*d) Not at all interested. All 3 who responded with this answer intend to pursue careers related to geoscience and all three intend to apply to a M.S. or Ph.D. program to do research. Hence the MGeo is not well suited for them.

*c) Moderate-to-low interest. Of the 7 who responded with this answer 5 intend to pursue careers in geosciences and 1 is undecided. 4 were already considering applying to an M.S. or Ph.D. program to do research and 3 were not. 1 is interested in teaching but felt the degree emphasized “engineering” too much; 1 questioned the comparative quality of a MGeo; 1 expressed a lack of money.

*d) Moderate-to-high interest. Of the 12 who responded with this answer 11 intend to pursue careers in geosciences and 1 is undecided. 6 were already considering doing a M.S. or Ph.D. and 6 were not. 2 are attracted by the short degree time of the MGeo; 1 expressed concern about lack of money; 2 expressed concern that the value of the MGeo would not be recognized by employers as being comparable in quality to an M.S.

*e) Really, really interested. All 5 who responded with this answer intend to pursue careers in geosciences. 4 were already considering apply to an M.S. or Ph.D. program and 1 was not.

Here are a few excerpts from the comments received (complete survey results given in Appendix II).

"This program is exactly what I have been looking for, and I hope it gets put into place soon."

"Really, really interested, with a caviat. In in my current situation I am moving back to the mainland for family reasons, so I wouldn't be able to stay in the area to attend. However, with that said, I wish that wasn't the case because this would fit perfectly with my career goals I think. As I am not looking to pursue an academic career, the integration of the practical work experience into a program of study is invaluable and highly attractive to me. Also the inclusion of engineering into the program is attractive given the job outlook figures for environmental engineering."

"The degree interests me because it will only take 1 additional year after getting a B.S. in GG. Also, I like that it is geared towards applications of geoscience and doesn't require a research thesis."

"I am really interested, however, I have been 5 years in college and I would like to take a break from schooling and try to pursue a career. It would have really helped if this was available and I knew about it a few years ago... I really believe that this program should have been available a long time ago. "

-9-
4. Statement of Program Objectives

The Master’s of Geoscience (MGeo) program will provide a rigorous post-baccalaureate education in the geosciences (meaning geology, geophysics, and hydrology) for individuals who wish to pursue or are working in careers related to geoscience, but not necessarily in scientific research. In addition to coursework that emphasizes societally relevant applications, the program will provide practical work experience for students and bolster connections between GG and employers in Hawai‘i as well as in the U.S. mainland. The program will be an efficient path for those with a B.S. in geology and geophysics (including GG B.S. majors) to obtain a Master’s degree because the MGeo can be completed with only one year of study. It also will be open for students with bachelor degrees from other fields such as UH’s CEE and CTAHR or similar disciplines. Through a combination of appropriate course scheduling and providing online content, the program will also serve working professionals.

Student learning objectives:

1. MGeo graduates are proficient in applying technical knowledge of relevant theory, computer applications, laboratory methods, field methods, and the supporting disciplines (math, physics, chemistry, biology) in solving real-world problems in the geology, geophysics, and/or hydrology.

2. MGeo graduates are able to define and successfully complete a body of work or research that has practical benefit to industry and/or society. In addition, they are able to effectively communicate their work in a written report as well as in an oral presentation at a professional level as evaluated by scientists and other professionals.

3. MGeo graduates have acquired the knowledge and skills needed to pursue employment or other activities that contribute to the advancement of the Earth sciences and/or strengthen the benefit of their application to societal problems.

5. MGeo Program Description

5.1 Target Market

The MGeo is for recent baccalaureates who desire an advanced degree and professional experience needed to enter the job market with minimal additional time in school. It is also for working professionals who seek a Master’s credential and practical training for specialization in geoscience. The MGeo is appropriate for career pursuits in fields such as:

-Environmental consulting, environmental engineering, environmental geology
-Engineering geology, geotechnical engineering, and offshore surveying
-Hydrology and water resources
-Natural hazards mitigation and adaptation
-Climate change adaptation
-Petroleum and gas exploration, including offshore exploration
-Economic geology and mining
-Renewable energy
-Intermediate or high school teaching

The name “MGeo, Masters of Geoscience” was carefully chosen so it can be marketed as a program that is clearly distinct from our existing, research-based degree tracks. The MGeo program is designed with considerable breadth, allowing students—with ad-
Proposal for a Professional Master of Geoscience (MGeo)

vice from faculty mentors—to design a set of courses to meet their specific professional needs. Our long-term goal is that the MGeo name will be recognized throughout Hawaii as well as nationally.

5.2 Distinguishing Features

• Five-year masters: The MGeo can be completed in one year beyond a B.S. degree in geology and geophysics. It is therefore possible for an entering undergraduate freshman to earn a B.S. in the Department of Geology and Geophysics in four years, followed by an MGeo degree in one more year.

• The MGeo degree differs from the M.S. degree by requiring slightly (6 hrs) more course work, by emphasizing courses in applied geoscience, by providing students with the opportunity to gain experience in business, economics, or management, and by providing practical work experience. The current M.S. degree is for students who wish to pursue scientific research through a completed research project and thesis (Plan A) or a literature study (Plan B). The MGeo requires a work project with a local company or agency, followed by a written report and oral presentation.

• MGeo students will pay tuition. Unlike M.S. students, MGeo students will not be eligible for research assistantships (RAs), teaching assistantships (TAs), or tuition waivers. Teaching experience, if desired, can be gained by enrolling in GG609 Graduate Teaching in Geology or courses in the College of Education. The MGeo must therefore be marketed as being clearly distinct from GG’s other degree tracks. A related, proposed distinction is that 85% of the tuition revenue come back to GG analogous to the practices of the other professional degree programs at UH (e.g., MBA, Nursing).

• Key courses will be taught during the early mornings, evenings or possibly weekends, and include online content (e.g., lectures or recordings of lectures posted online) so they will be more available to working professionals.

5.3 Admissions Requirements

A Bachelor’s degree in natural science from an accredited university is required by the time a student begins the MGeo. Like GG’s current M.S. degree, the application materials will include a statement of objectives, GG’s supplemental information form, three letters of recommendation, official transcript from each institution attended, official GRE scores, and official TOEFL scores for international applicants. Other requirements are specified by the University of Hawai‘i Graduate Division Admissions.
5.4 Course Requirements

The MGeo requires a minimum of 30 credit hours at the 300 level and above (beyond what may have been taken for the B.S. here in GG). A total of 6 credit hrs are required for the work-study requirement (GG750 MGeo Professional Project). A minimum of 12 credits should be in GG graduate courses (GG600-798, excluding GG750). Letter grades (A,B,C) must be taken in courses for at least 18 credits (excluding GG750 MGeo Professional Project). GG740 (MGeo Seminar, 1 credit hr) must be taken once a year. The following undergraduate courses may also be taken provided they were not previously taken to fulfill the BS.

<table>
<thead>
<tr>
<th>Elective Undergraduate Courses</th>
<th>credit hrs</th>
<th>Average Ranking*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volcanology (GG300)</td>
<td>3</td>
<td>3.83</td>
</tr>
<tr>
<td>Hawaiian Geology (GG402)</td>
<td>3</td>
<td>4.52</td>
</tr>
<tr>
<td>Natural Disasters: Geoethics and the Layman (GG406)</td>
<td>3</td>
<td>n/a</td>
</tr>
<tr>
<td>Geological Data Analysis (GG413)</td>
<td>3</td>
<td>3.75</td>
</tr>
<tr>
<td>Coastal Geology (GG420)</td>
<td>3</td>
<td>3.52</td>
</tr>
<tr>
<td>Marine Geology (GG423)</td>
<td>3</td>
<td>3.80</td>
</tr>
<tr>
<td>Environmental Geochemistry (GG425)</td>
<td>3</td>
<td>3.92</td>
</tr>
<tr>
<td>Geophysical Methods (GG450)</td>
<td>4</td>
<td>3.52</td>
</tr>
<tr>
<td>Hydrogeology (GG 455)</td>
<td>4</td>
<td>4.96</td>
</tr>
<tr>
<td>Engineering Geology (GG454)</td>
<td>3</td>
<td>4.32</td>
</tr>
<tr>
<td>Geological Remote Sensing (GG460)</td>
<td>4</td>
<td>3.36</td>
</tr>
<tr>
<td>Geospatial Information (GG461)</td>
<td>3</td>
<td>n/a</td>
</tr>
<tr>
<td>Fluid Mechanics (CEE 320)</td>
<td>4</td>
<td>n/a</td>
</tr>
<tr>
<td>Geotechnical Engineering (CEE 355)</td>
<td>4</td>
<td>n/a</td>
</tr>
<tr>
<td>Statistical Analysis for Business Decision (BUS 310)§</td>
<td>3</td>
<td>n/a</td>
</tr>
<tr>
<td>Engineering Management (ENGR 401)§</td>
<td>3</td>
<td>n/a</td>
</tr>
<tr>
<td>Engineering Economics (CEE 405)§</td>
<td>3</td>
<td>n/a</td>
</tr>
<tr>
<td>Environmental Impact Assessment (GEOG 412)§</td>
<td>3</td>
<td>n/a</td>
</tr>
</tbody>
</table>

*An employer survey was conducted in 2001 as part of a series of surveys done to meet the WASC accreditation requirements. Fifty-one companies and employer organizations were contacted; 25 replied with complete responses (~50% return rate). The employers were asked to rank each GG course in terms of relevance to their work. The numbers above are the average rankings [http://www.soest.hawaii.edu/GG/resources/gg_documents.html]. n/a refers to a course that was either created after the survey was done or is in another department.

§Students who do not already have experience in business, economics, or management are encouraged to select from these courses.

The coursework may be further tailored to meet the specific interests of the students by substituting other courses in other departments (e.g., CEE, CTAHR, Shidler College of Business), subject to approval of the MGeo Faculty Oversight Committee (MGOC).

The curriculum is designed to meet a diversity of professional needs. For example, MGeo students with a B.S. in Geology and Geophysics, will benefit by taking some of the above business and management classes; whereas many working professionals may already have experience in these areas and wish to take only GG courses. GG740 (MGeo Seminar, 1 credit hr) and GG750 (MGeo Professional Project) are the only required courses. GG740 (MGeo Seminar) will provide professional training and exposure through lectures by GG professors and professionals in local businesses and state offices.
Proposal for a Professional Master of Geoscience (MGeo)

Students will also write and learn how to give professional talks in preparation for their final report. GG740 must be taken every year the student is enrolled in the program up to a maximum of three times. GG750 (MGeo Professional Project) will be taken to complete the culminating work experience (see Section 5.6 below). The rest of the curriculum will be designed by the student and faculty mentor to most appropriately build from the student’s background and best address their future career objectives.

5.5 Writing course requirement

At least 3 credits in a writing class must be taken within the total of 30 credits required for the degree. Eligible classes include any GG course designated as writing intensive (W) as well as ENG308, Technical Writing, and TPSS 657 Grant Writing for Graduate Students.

Hypothetical Schedule for a 2-year MGeo Taken Part Time (working professionals)

<table>
<thead>
<tr>
<th>Year 1 Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses</td>
<td></td>
</tr>
<tr>
<td>GG604 (Disaster Management: Understanding the Nature of Hazards)</td>
<td>3</td>
</tr>
<tr>
<td>GG420 (Coastal Geology, W)</td>
<td>3</td>
</tr>
<tr>
<td>GG425 (Environmental Geochemistry)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Cumulative Total:</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 1 Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses</td>
<td></td>
</tr>
<tr>
<td>GG640 (Coastal Geochemistry)</td>
<td>3</td>
</tr>
<tr>
<td>GG655 (Ground Water Modeling)</td>
<td>3</td>
</tr>
<tr>
<td>GG740 (MGeo Seminar)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Cumulative Total:</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

Work project as a volunteer or intern done in summer, or as an employee throughout the 2 years

<table>
<thead>
<tr>
<th>Year 2 Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses</td>
<td></td>
</tr>
<tr>
<td>GG455 (Hydrogeology)</td>
<td>3</td>
</tr>
<tr>
<td>GG461 (Geospatial Information)</td>
<td>3</td>
</tr>
<tr>
<td>GG750 (MGeo Professional Project)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Cumulative Total:</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 2 Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses</td>
<td></td>
</tr>
<tr>
<td>GG740 (MGeo Seminar)</td>
<td>1</td>
</tr>
<tr>
<td>GG652 (Gravity, Magnetics, &amp; Heatflow)</td>
<td>3</td>
</tr>
<tr>
<td>GG750 (MGeo Professional Project)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Cumulative Total:</strong></td>
<td><strong>32</strong></td>
</tr>
</tbody>
</table>

Hypothetical Schedule for 1-year MGeo Taken Full Time (e.g. for 5-yr Master’s)

<table>
<thead>
<tr>
<th>Year 5 Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses</td>
<td></td>
</tr>
<tr>
<td>GG604 (Disaster Management: Understanding the Nature of Hazards)</td>
<td>3</td>
</tr>
<tr>
<td>GG420 (Coastal Geology, W)</td>
<td>3</td>
</tr>
<tr>
<td>GG425 (Environmental Geochemistry)</td>
<td>3</td>
</tr>
<tr>
<td>GG455 (Hydrogeology)</td>
<td>3</td>
</tr>
<tr>
<td>GG461 (Geospatial Information)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Cumulative Total:</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 5 Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses</td>
<td></td>
</tr>
<tr>
<td>GG640 (Coastal Geochemistry)</td>
<td>3</td>
</tr>
<tr>
<td>GG655 (Ground Water Modeling)</td>
<td>3</td>
</tr>
<tr>
<td>GG740 (MGeo Seminar)</td>
<td>1</td>
</tr>
<tr>
<td>GG652 (Gravity, Magnetics, &amp; Heatflow)</td>
<td>3</td>
</tr>
<tr>
<td>GG750 (MGeo Professional Project)</td>
<td>6</td>
</tr>
<tr>
<td><strong>Cumulative Total:</strong></td>
<td><strong>31</strong></td>
</tr>
</tbody>
</table>

Work project as a volunteer or intern done in the summer
5.6 MGeo Professional Project: The Culminating Experience

Students are required to do a work-related project either as an intern, volunteer, or employee of a local company or agency. The culminating experience includes a written report or technical paper as well as an oral presentation on their work. The oral presentation can be made at UH or at the location of the sponsoring organization. A total of 6 credit hours must be taken in GG750 (MGeo Professional Project) for this project. GG740 will help students prepare for the oral presentation.

5.7 Program Administration

The Dean of SOEST and the Associate Dean of Academic Affairs provide ultimate oversight of the MGeo degree as with the other degree programs in SCEST. Graduation policies will be handled by the office of the Director of Student Services. The primary oversight of the MGeo will be performed by the MGeo Faculty Oversight Committee (MGOC) and GG's Department Chair who is also the Graduate Chair. The MGOC will be composed of GG members of the Graduate Faculty who will be appointed by and report to the GG Department Chair. To assure sufficient continuity of the program, each MGOC member will serve a three-year term with one third of the committee rotating off and being newly appointed each year. The chair of the MGOC will instruct the MGeo Intern Seminar (GG740). The MGOC will oversee the advertising of the degree and assist in building relationships with local companies and agencies for internships, members of the MGeo Advisory Board (see Section 11), and for job placement efforts.

5.8 Student Advising

SOEST's Director of Student Services will advise students on issues related to graduation policies, procedures, and milestones. A faculty advisor will be designated for each student who will help the student plan the course work and serve as the primary GG advisor on the student's work-related project. As such, the faculty advisor will be the instructor for the student's 6 credits of GG750 MGeo Professional Project.

The MGeo Faculty Oversight Committee (MGOC) will meet with each MGeo student during the Fall semester of each year. The MGOC will serve as a third-party resource for general advice to the student, will facilitate communication between the student and the faculty advisor, and collaborate with the faculty advisor to assess the student's proposed work project. The written report and oral presentation of the work project will be formally evaluated by the faculty advisor, one member of the MGOC (not the faculty advisor), and the project mentor at the sponsoring company or agency where the work was done.

6. Relationship to Board of Regents Criteria

The MGeo will directly support the following strategic goals of the UHM 2011-2015 Strategic Plan:

Goal 1 Transformative Teaching and Learning Environment: The focus on societally relevant applications and the inclusion of the practical work experience will "increase the experiential learning opportunities". These aspects will also strengthen the emphasis of teaching for faculty hiring, tenure and promotion, whereas research at GG is already highly emphasized. Providing a more efficient route to a Master’s degree will address the objective to "increase student success".
**Goal 3: An Engaged University:** The MGEO’s emphasis on applied geoscience, its design to serve those seeking or already involved in professions outside of basic research, the intern program, and the coordination with local leaders in industry, agencies, and schools will all enhance GG’s impact in “promoting scholarly work that informs policies and practices that benefit communities”, in expanding “internships” and “practica”, and in increasing “partnerships and sharing of expertise with community organizations”.

7. **Relationship to Other Programs at UHM**

The MGEO program will be distinct from any other Master’s degree program at UH. Those degrees that are most closely related to the MGEO are discussed below.

The Department of Civil Engineering’s (CE) M.S. degree has the option of concentrating in construction management and environmental engineering. The latter concentration includes study and research in hydrology, which is a point of similarity with the Department of Geology and Geophysics’s M.S. degree as well as the proposed MGEO degree. A student interested in hydrology would enter the MGEO program rather than CE to gain knowledge in the origin, properties, and distributions of different rock formations, the natural water cycle, as well as the use of geophysical methods (e.g., seismology, electrical resistivity, electrical-magnetic methods) in hydrologic applications. In fact, the MGEO would be an ideal degree for a student with a B.S. in Civil Engineering and a desire to pursue work in hydrology to gain a rigorous education in geology and geophysics. Hydrology is only one area of specialization, and the MGEO offers many other areas of specialization related to geology and geophysics.

Civil Engineering also offers a dual Master’s degree in Civil Engineering and Business Administration. This degree is similar to many degrees recognized by the Professional Science Master’s degree initiative (www.sciencemasters.com) in that it combines a science-related discipline with business. The MGEO degree does not require coursework in business or law, but does allow enough flexibility for such coursework.

Related to hydrology, The Water Resources Research Center (WRRC) is composed of faculty and researchers from a number of different UH departments, including GG. WRRC is not a degree-granting unit, but faculty members with joint appointments with other units supervise students that work on projects administrated by WRRC. Many of these projects are directed towards solving State water problems and can serve as options for students' culminating experience required for this program. Hence WRRC and the MGEO program are complementary and students in the MGEO degree could take full advantage of the faculty expertise and activities of the WRRC.

The College of Tropical Agriculture and Human Resources (CTAHR) offers M.S. degrees in Natural Resources and Environmental Management (NREM). The NREM M.S. involves studies in geospatial analysis and modeling, natural resources economics and environmental planning, land and water resource management, and terrestrial ecology. The points of similarity with geology and geophysics are in the use of GIS and remote sensing technology as well as in hydrology. Again, a student with a B.S. from CTAHR would enter the MGEO to gain a solid background in geology and geophysics.

The Department of Geography offers an M.A. degree, a Ph.D. degree and a Graduate Ocean Policy Certificate. Topics of research include: “Climate, Disturbance and Land Carbon”; “Climate and Ecohydrology”; “Vegetation, Environmental Change, and LiDAR
Remote Sensing”, “Community-Based Natural Resource Management”. Geography emphasizes the social sciences and how people interact with the land, water, or climate; whereas geosciences emphasizes the natural sciences and Earth’s natural processes. Geographers and geoscientists can, in some cases, use common tools including satellite imagery, high-resolution radar, LiDAR, and Geographic Information Systems (GIS) technology.

8. Similar Programs at Comparable Institutions

As described in Section 3.3 of this proposal the Professional Science Master’s (PSM) initiative recognizes 246 PSM programs and 114 affiliate institutions; most are in the U.S. but a few are in other countries. Fifty-two programs are classified as Environmental Science. Two programs that are most similar to the proposed MGeo are

•California State University San Bernardino’s Master of Science in Earth and Environmental Science [http://msees.csusb.edu], and

•Rice University’s Professional Master’s Degree in Subsurface Geoscience [http://sloan-pmp.rice.edu/]

Rice University’s Department of Earth Science is comparable in size and in its emphasis on research to UHM’s Department of Geology and Geophysics. This department houses Rice’s very successful Professional Master’s Degree in Subsurface Geophysics. Since it was created in 2001, Rice’s PSM program has grown steadily to >15 students in 2010. It is also interesting to note that while the enrollment in the PSM program has grown, their traditional M.S. enrollment has decreased. One interpretation of this trend is that many of the Rice’s would-be M.S. students now favor the professional degree. Rice University also boasts a 100% job placement for 2001-2010. Rice has taken advantage of their location in Houston, home to many companies in the petroleum industry. GG has placed some prior M.S. students in the petroleum industry but will likely supply a more diverse market with the MGeo program.

Other degree programs, not formally recognized by the PSM initiative include:

•University of Houston, Department of Earth and Atmospheric Science, Professional Master’s Degree with Emphasis in Petroleum Geoscience [http://www.geosc.uh.edu/graduate/professional-masters/index.php]. This program is designed as an “accelerated degree program” especially for working professionals seeking a higher degree in petroleum geoscience.

•University of Pennsylvania, College of Liberal and Professional Studies, Master of Science in Applied Geoscience [http://www.sas.upenn.edu/lps/graduate/msag]. “A master of applied geosciences isn’t just a master of geology degree; it combines expertise in
the theoretical areas of geology with technical expertise in geochemistry, geophysics, hydrogeology, and engineering geology. Getting an advanced degree in applied geosciences rather than just a geology masters degree prepares you to tackle a wide range of practical and pressing environmental problems in fields where you can make a real, practical difference.

- Western Virginia University, Department of Geology and Geogeography, Option II Professional Studies (http://www.geo.wvu.edu/geology/graduate/ma_requirements). "Goal: To prepare students for future Ph.D. studies or employment in geological research. The Thesis option is an intensive experience, involving more focused coursework and a relatively open-ended, and challenging project."

- Colorado School of Mines, Professional Master's (P.M.) in Geochemistry, P.M. in Mineral Exploration and Mining Geoscience, and P.M. in Petroleum Reservoir Systems (http://geology.mines.edu/pmaster.html). These are non-thesis degrees designed so they can be completed in a relatively short time by working professionals or in 5-years by new undergraduates.

- University of Washington, College of the Environment, Earth and Space Sciences, Masters in Applied Geosciences (http://www.ess.washington.edu/ess/education/grad/appliedms.html). "The Masters in Earth and Space Sciences, Applied Geosciences (MESSAGE) is designed for students who are seeking to go into the private sector and wish to have a lead role in geology, geophysics, environmental geology or engineering geology. The program offers a unique blend of classroom and field experiences to build fundamental knowledge and practical skills that employers in the private sector are seeking. Earn your Masters in an intensive 12-month program, or complete the degree part time while you work. Nine-day field seminars offer hands-on experience, without extended time away. Late afternoon and early evening class meetings accommodate work schedules. Some instructors offer the option to participate remotely, with video streaming and interaction via the internet."

- Boise State University, Dept. of Geosciences, Master of Earth Science (MESCi, http://earth.boisestate.edu/degrees/graduate/master-of-earth-science/) "The Master of Earth Science (MESCi) is a professional science degree program without a thesis requirement designed for students who are in the workforce or considering a career path where a thesis would not be a requirement. The curriculum in the MESCi is built around proven course strengths in our MS Geology, Geophysics, and Hydrologic Sciences programs... This provides the MESCi student with similar core skills, knowledge base, and focus as in the thesis based programs, skills which have proved vital to a broad range of fields, including policy, regulation, or management, in the areas of environment, natural resources, and urban planning. ...The Master of Earth Science is a graduate degree platform that will provide its graduates with a rigorous degree that will enhance their competitive edge in the job marketplace."

Almost all universities with graduate degrees in geoscience have M.S. degrees, which, like GG, offer a research thesis and a non-thesis option. The examples above are relatively new, separate degree programs geared for non-research careers and/or for currently working professionals. Some do not require a culminating experience, whereas the MGeo will require a work-related project, written report, and oral presentation. Feedback
### 10. Financial Projections (anticipated enrollment and costs)

#### Table 1. Academic Cost & Revenue. Template for New Program from the OVCAA

<table>
<thead>
<tr>
<th>Academic Cost and Revenue Template - New Program (adjust template for appropriate number of years) (Updated 10/31/12)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENTER ACADEMIC YEAR (i.e., 2011-2012)</strong></td>
</tr>
<tr>
<td><strong>Students &amp; SSH</strong></td>
</tr>
<tr>
<td>Year 1</td>
</tr>
<tr>
<td>A. Headcount enrollment (Fall)</td>
</tr>
<tr>
<td>B. Annual SSH</td>
</tr>
<tr>
<td><strong>Direct and Incremental Program Costs Without Fringe</strong></td>
</tr>
<tr>
<td>C. Instructional Cost without Fringe</td>
</tr>
<tr>
<td>C1. Number (FT) of FT Faculty / Lecturers</td>
</tr>
<tr>
<td>C2. Number (FT) of PT Lecturers</td>
</tr>
<tr>
<td>D. Other Personnel Costs</td>
</tr>
<tr>
<td>E. Unique Program Costs</td>
</tr>
<tr>
<td>F. Total Direct and Incremental Costs</td>
</tr>
<tr>
<td><strong>Revenue</strong></td>
</tr>
<tr>
<td>G. Tuition</td>
</tr>
<tr>
<td>H. Other</td>
</tr>
<tr>
<td>I. Total Revenue</td>
</tr>
<tr>
<td>J. Net Cost (Revenue)</td>
</tr>
</tbody>
</table>

#### Program Cost per SSH With Fringe

<table>
<thead>
<tr>
<th>K. Instructional Cost with Fringe/SSH</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1. Total Salary/FT Faculty / Lecturers</td>
</tr>
<tr>
<td>K2. Cost Including Fringe of K1</td>
</tr>
<tr>
<td>K3. Total Salary PT Lecturers</td>
</tr>
<tr>
<td>K4. Cost Including Fringe of K3</td>
</tr>
<tr>
<td>L. Support Cost/SSH</td>
</tr>
<tr>
<td>Non-Instructional Exp/SSH</td>
</tr>
<tr>
<td>System-wide Support/SSH</td>
</tr>
<tr>
<td>Organized Research/SSH</td>
</tr>
<tr>
<td>M. Total Program Cost/SSH</td>
</tr>
<tr>
<td>N. Total Campus Expenditure/SSH</td>
</tr>
</tbody>
</table>

#### Instruction Cost with Fringe per SSH

<table>
<thead>
<tr>
<th>K. Instructional Cost/SSH</th>
</tr>
</thead>
<tbody>
<tr>
<td>O. Comparable Cost/SSH</td>
</tr>
</tbody>
</table>

The following rows of Table 1 were taken from Table 2 (below) using the following methods.

**A. Headcount Enrollment** is a function of the “projected number of entering students" (Table 2, row 8). Half of these students are assumed to be full time and thus finish the degree in one year; the other half are assumed to be half-time students taking two years to finish the degree (See Table 2, rows 8-11).

**B. Annual SSH** assumes the half-time students take 15 hrs/yr and full-time students take 30 hrs/yr (Table 2, row 11)
from GG’s alumni and local employer’s have reiterated the importance of writing and oral communication. The MGeo will be sure to emphasize these skills.

9. Resources Required and Resources Available

As discussed in Section 2, because the size of GG’s graduate program is limited primarily by extramurally funded research projects, many of GG’s graduate courses are under enrolled. Consequently, GG’s resources in terms of the number of class rooms, faculty, as well as course offerings are already sufficient to meet the expected demands of the program. GG estimates a negligible additional cost (about $1000/yr) needed for supplies, advertising, and hosting visits by local business leaders for annual meetings of the MGeo Advisory Board (see Section 11 below). The larger monetary cost will be for lectureships needed for GG740 (MGeo seminar) and to partly cover introductory undergrad course so faculty can provide more offerings of the relevant MGeo courses; and the partial FTE needed for GG740, GG750 (MGeo Professional Project) and for the MGeo Advisory Committee (see Section 11 below). All added costs will be supported by the tuition dollars returned to GG or will be absorbed by SOEST.

The potentially larger challenge on resources will be on time. Courses will need to be offered at times that will accommodate the schedules of both working professionals as well as traditional, full-time (B.S., M.S., and Ph.D.) students. Initially, when the program is first created, but when the MGeo enrollment is likely to be minimal, the most essential courses will be scheduled at the beginning (e.g., 8:00 and 9:00 a.m.) or end of the day (e.g., 4:00 and 5:00 p.m.). As the program grows—potentially reaching numbers that are comparable to our current M.S. program—we will progressively shift our course offerings so that the bulk of the upper-level undergraduate and graduate courses are taught in the early mornings and late afternoons: e.g., upper-level undergrad courses taught early mornings (MWF) and graduate classes taught late afternoons or early evenings (TR). Some courses have lab sessions that meet once a week for 3 hours (e.g., GG450 Geophysical Methods; GG455 Hydrogeology). It may be necessary to teach more of these lab sessions during the weekend than is currently done. With time and with increasing MGeo enrollment, we will gain more knowledge of what courses are best rescheduled during the week, which should be taught during the weekends, which can be taught at night, and which courses can be effectively taught by posting videos of lectures on the internet.
# Proposal for a Professional Master of Geoscience (MGeo)

<table>
<thead>
<tr>
<th>Table 2. Cost-Revenue Worksheet</th>
<th>(yellow rows feed into those in Table 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year</strong></td>
<td><strong>2013-14</strong></td>
</tr>
<tr>
<td><strong>Expenses</strong></td>
<td></td>
</tr>
<tr>
<td>1) Faculty FTE</td>
<td>0.51</td>
</tr>
<tr>
<td>2) FTE COST</td>
<td>$50,490</td>
</tr>
<tr>
<td>3) Other personnel</td>
<td>$3,679</td>
</tr>
<tr>
<td>4) Lecturers PT</td>
<td>$16,857</td>
</tr>
<tr>
<td>5) Supplies (including advertising, hosting business leaders)</td>
<td>$1,000</td>
</tr>
<tr>
<td>6) Other</td>
<td></td>
</tr>
<tr>
<td>7) Total Expenses for All 30 Credit hrs</td>
<td>$72,026</td>
</tr>
<tr>
<td><strong>Revenue</strong></td>
<td></td>
</tr>
<tr>
<td>8) Projected No. of Entering Students</td>
<td>4</td>
</tr>
<tr>
<td>9) Projected No. of Full-Time Students</td>
<td>2</td>
</tr>
<tr>
<td>10) Proj. No. Half-Time Students</td>
<td>2</td>
</tr>
<tr>
<td>11) Projected Enrollment</td>
<td>4</td>
</tr>
<tr>
<td>12) No. of Credit Hrs Taught</td>
<td>30</td>
</tr>
<tr>
<td>13) Student Semester Hrs (full-time students take 30 hr/yr; half-time students take 15)</td>
<td>90</td>
</tr>
<tr>
<td>14) % of all students in courses numbered 300 and above</td>
<td>7.0%</td>
</tr>
<tr>
<td>15) % of all students served by staff</td>
<td>3.3%</td>
</tr>
<tr>
<td>16) Tuition Rate per cred. Hr. (In-State)</td>
<td>$514</td>
</tr>
<tr>
<td>17) Revenue from Tuition (In-State)</td>
<td>$46,260</td>
</tr>
<tr>
<td>18) Other Sources of Income</td>
<td></td>
</tr>
<tr>
<td>Total Revenue</td>
<td>$46,260</td>
</tr>
<tr>
<td>20) Net Cost to UH (Expenses minus Revenue)</td>
<td>$25,766</td>
</tr>
</tbody>
</table>

C1 Number of faculty FTE is based on 0.2 FTE per semester hour. The amount of new FTE is 0.1. This is needed to support GG740 MGeo Seminar (2 hrs), GG750 MGeo Professional Project and the MGeo Oversight Committee. The remaining FTE is based on the MGeo percentage of all students taking courses number 300 and above (Table 2, row 14). This percentage assumes 20 M.S. students (average enrollment from 2000-2010), 15 Ph.D. students (50% of average enrollment 2000-2010), and 4.75 undergraduate students (half of fourth-year students out of the average of 38 during 2000-2010, or 0.5 x 0.25 x 38 = 4.75) also enrolled in the same courses as the MGeo students. Thus, for year 1, the fraction of 29 credits being taken by MGeo students is 2 full-time plus 2 half-time = 3 MGeo students, divided by 4.75+20+15+3=42.5, or 3/42.75=0.07. The estimated FTE for 29 hrs is 29 x 0.07 x 0.2=0.41. For year 1, the total FTE is 0.1 (new)+ 0.41 (for courses already being taught)=0.51. This number grows with the enrollment because the MGeo becomes a larger percentage of the total student population taking the relevant courses.

C2 Lecturers PT: GG anticipates providing part-time lectureships for one or two professionals who contribute to GG740 MGeo Seminar as well as to cover a few introductory
undergraduate courses so faculty are able to provide more offerings of the appropriate MGeo courses. A total of only 1.0 FTE of a part-time lecturer is needed per year.

D. Other Personnel Costs are based on the annual salaries of two administrative assistants ($48,400+$44,00) and 30% of that for the Director of Student Services ($64,000*0.3=$19,200) for a total of $111,600. This total is multiplied by the MGeo percentage of all students serviced by these staff members. For year 1, this percentage is 2 full time plus 2 half-time = 3 MGeo students, divided by 38 (undergrads) + 20 (M.S.) +30 (Ph.D.) +3 (MGeo) total students = 3/(38+20+30+3) = 0.033 (Table 2, row 15. 2012-13). The other personnel cost for year 1 is thus $111,600*0.033=$3,679.

K1. Total Salary FT Faculty is the product of the average 9-month salary of GG instructors ($99,000) and the number of FTE (Table 2, row 1)

The “Net Cost” estimates of Table 1 includes faculty FTE that are already being used to teach the same classes. The additional cost of the program is far less. GG proposes that 85% of the tuition revenues be returned to GG analogous to the practice with other professional degree programs at UHM (e.g., MBA, Nursing). These revenues will be sufficient to support a growing MGeo program and will benefit GG overall.

11. Assessment of Student Performance and Program Effectiveness

Student performance will be assessed in much the same way as is done for GG’s M.S. program: grades in coursework, reviews of overall student progress during annual meetings with the MGeo Faculty Oversight Committee (MGOC), and evaluations of the written report and oral presentation by the faculty advisor, a representative from MGOC, and the mentor at the company or agency where the work was done.

The MGeo program effectiveness will be assessed based on its ability to address the student learning objective (listed again as they are in Section 4):

1. MGeo graduates are proficient in applying technical knowledge of relevant theory, computer applications, laboratory methods, field methods, and the supporting disciplines (math, physics, chemistry, biology) in solving real-world problems in the geology, geophysics, and/or hydrology.

2. MGeo graduates are able to define and successfully complete a body of work or research that has practical benefit to industry and/or society. In addition, they are able to effectively communicate their work in a written report as well as in an oral presentation at a professional level as evaluated by scientists and other professionals.

3. MGeo graduates have acquired the knowledge and skills needed to pursue employment or other activities that contribute to the advancement of the Earth sciences and/or strengthen the benefit of their application to societal problems.

One set of assessments will involve reviews of student grades in classes, performance measures of the final work project, as well as job placement success rates. These will be done by the MGOC and reported to the Department and Graduate Chair. A second assessment activity will be done in collaboration with the MGeo Advisory Board. The MGeo Advisory Board will be leaders in businesses, agencies, and schools in Hawai`i who will provide advice and assistance with the overall MGeo program development, student recruitment, internships, and job placement. They will be invited annually to
spend an afternoon in the department, where they will see presentations by current students near graduation, and meet with the chair of the MGOC, the Department Chair, the Associate Dean of Academic Affairs, as well as the Dean of SOEST. This will be an opportunity for the Advisory Board provide feedback about the quality of work the students are performing, make curriculum suggestions, help GG identify companies who may be interested in interns, and to help keep GG aware of current trends in the workplace.
# Proposal for a Master of Geoscience (MGeo)

## Appendix 1. Course Proposals for GG740 MGeo Seminar, and GG750 MGeo Professional Project

### UNIVERSITY OF HAWAI'I AT MĀNOA

#### UHM-1 FORM (ADD A COURSE)

1. **Course Subject**
   - GG

2. **Course Number**
   - 740

3. **Effective Term (semester & year)**
   - Fall 2013

4. **Frequency (check all that apply)**
   - [ ] Fall semester
   - [ ] Spring semester
   - [ ] Alternate years
   - [ ] Summer semester

5. **Offering Status (check one)**
   - [ ] Regular
   - [ ] Experimental
   - [ ] Single-term

6. **Full Course Title**
   - MGeo Seminar

   - **BANNER Course Title** (30 characters maximum, including spaces/punctuation. Alpha courses attach separate sheet & specify title for each alpha)
   - MGeo Seminar

7. **Grade Option (check all that apply)**
   - [ ] Letter Grade
   - [ ] Satisfactory/Unsatisfactory
   - [ ] Credit/No Credit
   - [ ] Audit
   - [ ] Honors (Medicine only)

8. **Gen Ed Core or Hawaiian/Second Language Requirement Designation (check one)**
   - [ ] Do not consider for Core or Hawaiian/Second Language designation.
   - [ ] Request approval of General Education/Second Language (GESL) designation. (For Foundations also submit a proposal to General Education Office.)

9. **Contact Hours (measuring hours per week - if variable, specify range)**
   - 1

10. **I. 1 of credits (if variable, give range)**
    - 1

11. **Repeat Limit**
    - 2

12. **Credit Limit**
    - 3

13. **Schedule**
    - [ ] Lecture (LEC)
    - [ ] Laboratory (LAB)
    - [ ] Seminar (SM)
    - [ ] Lecture/Discussion combined (LED)
    - [ ] Lecture/Laboratory combined (TEL)
    - [ ] Thesis/Dissertation (THE)
    - [ ] Hybrid Technology Intensive (HTI)
    - [ ] Directed Reading or Research (DRR)
    - [ ] Field Experience/Internship/Practicum (FRI)

14. **Co-requisite Course(s)**
    - 15a. **Major Restriction (as it should appear in Catalog)**
    - 15b. **Banner codes of acceptable majors**

16. **Class Standing Restriction**

17. **Prerequisite Course(s)** (Use "and"",",", or punctuation to indicate relationships between prerequisites. "Or consent" is implied for all prerequisites. "Course" requirements can be implemented through your class schedule each semester.)

18. **Catalog Description (30 words: 85 words for alpha courses)**

   Seminar to improve student awareness of trends and practices in geoscience professions, and develop ability to prepare, deliver, and evaluate a professional scientific presentation. The course targets abstract writing, oral presentation, and technical criticism.

19. **Justification**

   Attach separate sheets and indicate the rationale for the request, expected course enrollment, and a course syllabus specifying student learning objectives for the course. Syllabus are not required for "59" courses.

20. **Cross-listed or Honors Courses**

<table>
<thead>
<tr>
<th>Course Subject &amp; Number</th>
<th>Chair/Director</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Subject &amp; Number</td>
<td>Chair/Director</td>
<td>Signature</td>
</tr>
<tr>
<td>Course Subject &amp; Number</td>
<td>Chair/Director</td>
<td>Signature</td>
</tr>
</tbody>
</table>

21. **Requested By**

   I certify that the student learning objectives for the course are consistent with the learning objectives of each program under which the course is listed.

   | Department/Unit | Chair/Director | Signature | Date |
   |-----------------|----------------|-----------|

22. **Approved By**

   | 1st College or School | Dean | Signature | Date |
   | 2nd College or School | Dean | Signature | Date |
   | General Education (Undergraduate courses numbered 100-499) | Director | Signature | Date |
   | Graduate Division (500 level and above) | Dean | Signature |

23. **Mānoa Chancellor's Office**

   | Vice Chancellor for Academic Affairs | Signature | Date |
GG740 Catalog Description (35 word limit)

Seminar to improve student awareness of trends and practices in geoscience professions, and develop ability to prepare, deliver, and evaluate a professional scientific presentation. The course targets abstract writing, oral presentation, and technical criticism.

Item 19: Justification for GG740 (MGeo Seminar)

Rationale for the request

The Department of Geology and Geophysics (GG) is proposing a new graduate degree (MGeo) in applied geosciences to prepare students for professional work. The MGeo will be a professional Master's degree program for students who seek careers in geoscience-related industries, but not necessarily research. The MGeo differs from Department of Geology and Geophysics's (GG's) M.S. degree, which emphasizes basic research rather than industry applications. Rather than a research thesis, MGeo students will do a work project as a volunteer, intern, or as an employee of a local company or agency, followed by a written report and oral presentation. The MGeo will be an efficient path to a Master's degree for individuals with a B.S. in geology and geophysics because they can complete the MGeo with only one additional year of study. Students may also enter the program from others disciplines such as civil engineering, environmental engineering, and agriculture and resource management. In addition, courses will be scheduled appropriately or given online to make the MGeo available to working professionals.

The MGeo Seminar (GG740) is one of the two new courses necessary for the MGeo degree and is integral to the program. MGeo students must take GG740 in each year they are enrolled in the degree program for up to three years. One objective of the course is to provide students with exposure to local geoscience industries and relevant professional practices. This will be done by guest lectures from GG professors as well as professionals in local businesses and state offices. Students will then be able to make more informed decisions about what fields or even what companies to pursue. The other objective is to teach students how to give professional scientific talks and to provide practice in writing. Oral communication is one of the areas identified most frequently by employers where additional coursework is desired. Students will gain instruction and practice in formulating their ideas and relevant concepts in a logical sequence for presentation; in designing attractive, intuitive, and informative visuals; in speaking clearly and confidently; and in effectively making their key points and conclusions.
Course syllabus specifying student learning objectives for the course

The goal of GG740 MGeo Seminar is to improve student's awareness of professional trends and practices, and to teach students how to prepare, deliver, and evaluate a professional scientific presentation. Presentations by GG professors and professionals in local businesses and state office will inform students about trends in geoscience industries and professional practices in Hawaii. These guest lectures will also help students learn how to give effective oral presentations themselves. Students will then learn how to prepare and give their own presentations. In addition, students will gain practice in writing by writing abstracts of their presentations. Formal evaluations of talks and written assignments by the students will be re-enforce the learning objectives throughout the semester.

Student Learning Outcomes

Students have sufficient exposure to different geoscience career paths available in Hawaii so they can make informed decisions about which fields or companies to pursue. Students are able to design and give oral presentations so their main points are clearly communicated and confidence in their professional capabilities is engendered.

Course Activities and Assignments

- **Presentations by guest speakers.** Invited speakers in the professional community will be given lectures on activities and trends in their geoscience-related industry, case histories and common technical practices.

- **Introductory lectures by course instructor.** Various introductory lectures will address key aspects of writing effective technical abstracts (e.g., in “Scrutiny of the Abstract, II”, by K.K. Landes) and in designing and presenting interesting and memorable talks. The lectures on giving talks will address topics such as: (1) traits of good talks; (2) preparation goals; (3) differences between short talks and long talks; (4) differences between written and oral presentations; (5) techniques for effective presentations. Another lecture or two will teach effective graphics design.

- **Writing assignments.** Students will learn to write concise and informative abstracts. They will prepare and revise at least one abstract on their main presentation with the assistance of the course instructor. The final abstract must satisfy the instructor.

- **Oral Presentation.** Students will learn to prepare and deliver at least one main presentation ~12-20 minutes long. The number of any other presentations will depend on the class enrollment and the availability of external speakers. The length of each presentation will be timed and compared against the target time. At least one presentation will be on their degree project, a work project, or a case history chosen in consultation with the course instructor. The effectiveness of the presentation will be evaluated by the course instructor and by the other students in the class based on four main criteria: vital organizational elements, technical content, presentation mechanics, and speaker performance. The final presentations will be expected to meet the standard of a professional in junior standing.

- **Critique of Oral Presentations.** Students will learn to constructively critique the effectiveness of presentations of oral presentations by (1) critiquing the presentations of the instructor or guest lecturers, (2) critiquing the presentations by the other students enrolled in the class, and (3) receiving critiques on their own presentation(s). The critiques will focus on vital organizational elements of the talk, technical content, presen-
Proposal for a Professional Master of Geoscience (MGeo)

tation mechanics, and speaker performance. The course instructor will evaluate the degree to which student critiques address these areas.

Grading

Grades will be decided based on the instructor’s evaluations of the student’s contributions in the class as well as assignments, including oral presentations, writing assignments, and critiques of presentations by peers.

Idealized schedule (assuming 6 students)

<table>
<thead>
<tr>
<th>Week</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-7</td>
<td>Guest speakers and instructor introductory lectures</td>
</tr>
<tr>
<td>8-15</td>
<td>Student presentations</td>
</tr>
</tbody>
</table>

Expected course enrollment

The enrollment is expected to start at ~4 students/year and grow to ~12 students/year within a few years from the start of the MGeo program in 2013.

Additional resources (if any) that will be required to teach the course

No additional resources are required.

Academic units for which the course is or will be a major or degree requirement

GG740 will be required for students in the proposed MGeo degree, a graduate degree to be offered by the Department of Geology & Geophysics in applied geological sciences.
UNIVERSITY OF HAWAII AT MĀNOA
UHM-1 FORM (ADD A COURSE)

See Guidelines for instructions and deadlines. For undergraduate courses, submit an original and 4 copies; graduate courses, submit an original and 6 copies. If cross-listed, include extra copies for cross-listed department(s) & college(s). List one course per form. Attach additional sheets as needed.

<table>
<thead>
<tr>
<th>1. Course Subject</th>
<th>2. Course Number</th>
<th>3. Effective Term (semester &amp; year)</th>
<th>4. Frequency (check all that apply)</th>
<th>5. Offering Status (check one)</th>
<th>6a. Full Course Title (Alpha courses: attach separate sheet &amp; specify title for each alpha)</th>
<th>6b. BANNER Course Title (50 characters max, including spaces/punctuation. Alpha courses: attach separate sheet &amp; specify title for each alpha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG</td>
<td>750</td>
<td>Fall 2013</td>
<td>8. Gen Ed Core or Hawaiian/Second Language Requirement Designation (check one)</td>
<td></td>
<td>MGeo Professional Project</td>
<td>MGeo Professional Project</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GEC List</td>
<td>Do not consider for Core or Hawaiian/Second Language designation.</td>
<td>Request approval of Divorision (DA, DH, DL, DB, DD, DY, DS), Foundations (FW, FS, FC), or Hawaiian/Second Language (HSL) designation. (For Foundations, also submit a proposal to General Education Office.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Grade Option (check all that apply)</td>
<td>9. Contact Hours (contact rate if different, specify range)</td>
<td>10. I of credits (if variable, give range)</td>
<td>11. Repeat Limit</td>
<td>12. Credit Limit</td>
<td>13. Schedule Type (check all that apply)</td>
<td>14. Co-requisite Course(s)</td>
</tr>
<tr>
<td>Letter Grade</td>
<td>1.00-4.00</td>
<td>1-6</td>
<td>5</td>
<td>6</td>
<td>Lecture (LEC)</td>
<td>MGeo</td>
</tr>
<tr>
<td>Satisfactory/Unsatisfactory</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td>Laboratory (LAB)</td>
<td></td>
</tr>
<tr>
<td>Credit/No Credit</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td>Seminar (SEM)</td>
<td></td>
</tr>
<tr>
<td>Honor (Medicine only)</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td>Discussion (DIS)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17a. Prerequisite Course(s) (Use &quot;and&quot;, &quot;or&quot; and punctuation to indicate relationships between prerequisites. &quot;Or course&quot; is implied for ALL prerequisites. &quot;Course&quot; requirements can be implemented through your class schedules each semester)</td>
<td>17b. Minimum required grade for prerequisites</td>
<td>17c. Blanket requirements listed in Catalog (if none, write &quot;none&quot;)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practical hands-on professional experience, typically with a local company or agency, and involving a final written report and an oral presentation. A grade of Satisfactory (S) is assigned when the internship presentations are satisfactorily completed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Catalog Description (Limit 35 words; 65 words for alpha courses)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Justification: Attach separate sheets and indicate the rationale for the request, expected course enrollment, and a course syllabus specifying student learning objectives for the course. Syllabus are not required for "90" courses.

20. Cross-listed or Honors Course(s) | Course Subject & Number | Chair/Director | Signature | Date |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Subject &amp; Number</td>
<td>Chair/Director</td>
<td>Signature</td>
<td>Date</td>
<td></td>
</tr>
</tbody>
</table>

21. I certify that the student learning objectives for the course are consistent with the learning objectives of each program under which the course is listed.

Department/Unit | Chair/Director | Signature | Date |

Approved By | 1st College or School | Dean | Signature | Date |
| 2nd College or School | Dean | Signature | Date |

General Education (Undergraduate courses numbered 100-499) | Director | Signature | Date |

Graduate Division (160 level and above) | Dean | Signature | Date |

Mānoa Chancellor's Office | Vice Chancellor for Academic Affairs | Signature | Date |
GG750 Catalog Description  (35 word limit)

Practical hands-on professional experience, typically with a local company or agency, and involving a final written report and an oral presentation. A grade of Satisfactory (S) is assigned when the internship presentations are satisfactorily completed.

Item 19: Justification for GG750 (MGeo Professional Project)

Rationale for the request

The Department of Geology and Geophysics (GG) is proposing a new graduate degree (MGeo) in applied geosciences to prepare students for professional work. The MGeo will be a professional Master’s degree program for students who seek careers in geoscience-related industries, but not necessarily research. The MGeo differs from Department of Geology and Geophysics’s (GG’s) M.S. degree, which emphasizes basic research rather than industry applications. Rather than a research thesis, MGeo students will do a work project as a volunteer, intern, or as an employee of a local company or agency, followed by a written report and oral presentation. The MGeo will be an efficient path to a Master’s degree for individuals with a B.S. in geology and geophysics because they can complete the MGeo with only one additional year of study. Students may also enter the program from other disciplines such as civil engineering, environmental engineering, and agriculture and resource management. In addition, courses will be scheduled appropriately or given online to make the MGeo available to working professionals.

Students are required to conduct a professional work-related project and present its outcome as the capstone of the MGeo program. The professional project parallels the M.S. thesis: it has an internship instead of an academic research component, students present final report instead of a thesis manuscript, and students give an oral presentation analogous to a thesis defense. The internship, in addition to providing practical work experience, provides the opportunity for the culminating project. The internship will be overseen jointly by a faculty advisor as well as the professional supervisor of the project.

GG750, MGeo Professional Project is one of the two new courses necessary for the MGeo degree and is integral to the program. A total of 6 credit hours are required of GG750 to complete the MGeo degree. GG750 MGeo Professional Project is designed to provide practical work experience. Although some students in the MGeo program will already be working professionals, others will not. Those who are not will fulfill their GG750 credit requirement by working as a volunteer or intern. The course is designed expressly for students who seek professional employment and is directly in line with UHM’s goals of “increasing the experiential learning opportunities”, “increasing student success”, “promoting scholarly work that informs policies and practices that benefit communities”, expanding internships and practica, and increasing “partnerships and sharing of expertise with community organizations”.

The MGeo Faculty Oversight Committee (MGOC) will meet with each MGeo student during the Fall semester of each year. The MGOC will serve as a third-party resource for general advice to the student, will facilitate communication between the student and the faculty advisor, and collaborate with the faculty advisor to assess the student’s proposed work project. The written report and oral presentation of the work project will be formally evaluated by the faculty advisor, one member of the MGOC (not the faculty advisor), and the project mentor at the sponsoring company or agency where the work was done.
Course syllabus specifying student learning objectives for the course

Students' have gained practical work experience at a professional level in a setting where the student can learn and apply their technical skills to address problems in an industrial setting. Owing to the nature of the course and the need for flexibility, the course has no formal syllabus.

Expected course enrollment

The enrollment is expected to start at ~4 students/year and grow to ~12 students/year within a few years from the start of the MGeo program in 2013.

Additional resources (if any) that will be required to teach the course

No additional resources are required.

Academic units for which the course is or will be a major or degree requirement

GG750 will be required for students in the proposed MGeo degree, a graduate degree to be offered by the Department of Geology & Geophysics in applied geological sciences.
Appendix 2. Feedback from Alumni and Professionals from email inquiries and Informal Market Survey

Feedback on the proposed MGeo program was requested to a few select individuals using an email patterned after the following.

From: Garrett [mailto:gito@hawaii.edu]
Sent: Friday, May 13, 2011 3:44 PM
To: William Cutler
Cc: Aly i El-Kadi
Subject: Prof. Masters Degree in Geoscience

Dear Bill,

The Department of G&G is developing a proposal for a professional Masters degree in geosciences (Mgeo), and I am writing to ask if you wouldn't mind providing some feedback. The Masters in Geoscience (Mgeo) aims to address a growing national demand for working professionals with strong science backgrounds. As such the MGeo will prepare students for science related careers in business, government, K-12 education, and non-profit organizations. The Mgeo's 30 credit hrs of coursework can be completed in 2 yrs full-time, 3-4 yrs part-time (e.g., by working professionals), or in 1 year in addition to our B.S. degree (i.e., a 5-year B.S.+Mgeo degree). In addition to coursework, students will be required to do a work-related project either as an intern, volunteer, or employee of a local company or agency. The culminating experience will involve a written report or technical paper as well as oral presentation on their work.

The attached document provides an overview of the program. We would value your thoughts on the concept overall or how to better meet the needs of professionals in your related field of work. We envision making many of the courses available online (live and recorded) and offering them at a range of times during the day, nights, and weekends. Any suggestions you might have at making the degree more accessible to working professionals would be helpful as well.

Last, please let us know if you think anyone in your company would be interested in hosting a volunteer or an intern to do a work-project.

I hope all is well with you and many thanks in advance for your consideration.

All the best,

Garrett

Replies are as follows

Date: Wed, 29 Jun 2011 19:38:20 -1000
From: Greg Kurkas <g_kuras@seafloorinvestigations.com>
Reply-To: g_kuras@seafloorinvestigations.com
Organization: Seafloor Investigations LLC
To: 'Garrett' <gito@hawaii.edu>
CC: g_kuras@seafloorinvestigations.com

Hey Garrett,

I took nearly a month, but I finally got to it. My apologies.

Comments below:

I think the MGeo (Masters degree in geosciences) is an excellent idea. There is a huge demand for people with various specialties and skills that also have backgrounds in earth science / geosciences. Typically companies find earth science people that they then train as analysis, CAD, GIS, Survey, env assessment, sampling & monitoring, businesses, law, etc...... I
think a M GEO degree would be a marketable degree and very desirable for professionals. Offering night courses opens the avenue to professional from many walks of life.

Have you spoken with local companies such as Oceanit, AECOM, TetraTech, etc.... setting up a dialog to at least hear their take and possible setup internships could be very valuable. If they have helped craft the M GEO degree (even a little) they would be more willing to send exec & mid-management to get the M GEO degree.....

The curriculum itself seems pretty solid on the geology side. You may wish to consider adding the below:

GIS – Geographic Information Systems
I DO think you should include a class or two from the geography dept that touches on GIS usage and principles. GIS has become SUCH a basic tool. Having course work in GIS provides skills for people seeking more technical jobs and a general understanding for the more management oriented. I think UH Dept of Geography offers courses.

HAZMAT / HAZWOPER training
I am unsure what local training exists; however, with the military presence here..... I suspect it does exist. It seems low-level and simplistic, but anyone working in the field requires it now ‘a days. It also give you an understanding of the procedural / bureaucratic nightmare that can (not always) exist in hazmat & environmental assessment world.

Required field work portion (not just work related... FIELD work)
I think you should require a portion of time in field work; a class, volunteer camp, internship, etc..... we all know how much of an impact field work has on understanding what went into getting the data and the limitations of data. Invaluable lessons. (And fun).

So that is my 2 cents. I’ll be more than happy to sit down and discuss this in details if you wish. Just give me a call.

Cheers,
Greg Kurras

Gregory J. Kurras
Seafloor Investigations LLC
93 S.ackson St # 28990
Seattle, WA 98104-2818 USA
Mb. -1-206-399-8815
Em. g_kurras@seafloorinvestigations.com
http://www.seafloorinvestigations.com

Date: Tue, 28 Jun 2011 14:20:54 -1000
From: James P Kauahakaua <jimk@usgs.gov>
To: Gordon W Tribble <gtribble@usgs.gov>

I’m intrigued by this idea. I certainly agree with Gordon about the necessary qualities that we look for in new operational hires (that seems to be the focus here). For our recent operational hires (Physical Science Tech, Electronics Tech, etc.) we have emphasized an understanding of geology and geophysics in order to better understand why some technical tasks were being done so I think you’re on the right track with this.
Proposal for a Professional Master of Geoscience (MGeo)

Our volunteer program occasionally takes in graduate level students but mostly senior undergraduates. This Professional Masters might also factor into the various internships Bruce Houghton and I have defined for funding if we can ever get a UHM-HVO cooperative agreement off the ground.

jim kauahikaua, Scientist-in-Charge
USGS Hawaiian Volcano Observatory
PO Box 51, 1 Crater Rim Road
Hawaii National Park, HI 96718

Subject: Re: MGEO degree in GSC- UHManoa
Date: Mon, 11 Jul 2011 12:11:11 -0700 (PDT)
From: Emily Chapp <emilychapp@yahoo.com>
To: Garrett<sgito@hawaii.edu>

Hi Garrett,

Great to hear from you! And congratulations on your promotion! I hope all is well with you and your family. Sorry it has taken me a while to respond, but I don't check this email very often. I can give you some feedback on my impressions of the degree as it relates to the oil and gas industry, but I'm afraid I wouldn't be much help as far as engineering or government agency work goes.

First I think it is a great idea to have a degree geared towards a non-academic career path. And it is also nice that undergrads can do a 5 year masters degree. Several schools that Chevron recruit from have this program.

One thing I would suggest from my experience that was helpful for those looking into the oil and gas industry is to take Greg Moore's 3D seismic interpretation class. I'm not sure if he still teaches it, but it is a great summary of the kind of data and tools that are used today by the major companies. I had no interest in the petroleum industry until I took that class, and most of my interview presentations to Chevron and Exxon were taken from my final project presentation.

Another idea that came to me for those looking for petroleum geology experience is to take a field course from one of the companies that does training courses for the major oil companies. There are several great courses from Rose and Associates as well as a company called Nautilus that are available. The have classes on structural geology, stratigraphy, salt tectonics, channelized depositional environments, etc.

For the MGEO, it looks like the required courses are similar to the masters degree with the exception that the students wouldn't need to do a research project with thesis. Instead, they could do an internship for a company and present to the department? If I read that correctly and this is the case, I might be a little cautious. I think completing a thesis is a basic requirement of students getting hired on today. It may hurt students (especially if the internship wasn't with an oil/gas company) when they compete against those who had a thesis project. From the interviewing and hiring that I've been a part of, the research project is a big part of the interview process. That may be Chevron specific though, so it might be good to talk to others on this topic.

Overall, I think it's a great idea to give students an opportunity to get a masters degree from a great research institution like SOEST, but have the flexibility to intern or continue working for other companies. Hopefully my feedback helped a little.

Again great to hear from you Garrett. If you guys are ever looking for a lecturer to teach about the petroleum industry, give me a call! I'm always looking for ways to get back to Hawaii!

Cheers-Emily
Proposal for a Professional Master of Geoscience (MGeo)

chapp@chevron.com

Date: Mon, 27 Jun 2011 13:13:01 -1000
From: Gordon W Tribble <gtribble@usgs.gov>
To: Garrett <gito@hawaii.edu>
Hi Garrett --
I think you have captured two of my top three requirements in new hires. The first, as a specific technical skill used throughout the marketplace, is the ability to understand and use geospatial data (GIS is far too often used to show pretty maps of some complex process with no fidelity to the accuracy of the data sets used in the calculation). The second is communication, both written and oral. Both are essential, and because they are not part of the science curriculum per se, students often don't get enough training. As with anything, improvement comes through practice, and forcing students to write and give oral presentations will serve them well down the road. Many of them many not like it (I still get stage fright standing in front of a group), but it's a necessary job skill.

My third requirement when selecting employees is teamwork and cooperation. And perhaps coaching that is where the internship program comes into play. We do use interns, but since nearly all of research projects are run from our Kilauea Field Station in Volcano, we've worked mostly through UH Hilo. In particular, Sharon Ziegler-Chong runs the PIPES program (see http://hilo.hawaii.edu/uhintern/). I know in they have placed interns across the State, and by no means are restricted to UH Hilo students, so she might be a good contact if you are thinking of expanding your network of contacts for internship opportunities.

I'm cc'ing Steve Anthony and Jim Kauahikaua, who run the other two USGS research offices here (and both are coincidently UH G&G grads) so they can add their thoughts ...

Gordon Tribble
Director, USGS Pacific Island Ecosystems Research Center
808-587-2405

From: William Cutler <wcutler@integral-corp.com>
Date: 6/3/2011 9:04 AM
To: Garrett <gito@hawaii.edu>
CC: Aly El-Kadi <elkadi@hawaii.edu>

Hi Garrett,

Sorry for getting back to you so late, I took a couple weeks off to go to mainland after finally completing my PhD work in May.

I generally like the idea of M GEO degree, since it allows for one to complete an advanced degree while working, but I'm not sure how large the population of potential applicants would be. I also have a bit of a concern about this degree diminishing the value of a traditional MSc Degree. I've always felt that the process of conducting a research-based thesis was more valuable than the course work, and that the difference between BSc and MSc students was the proven ability of MSc's to conduct independent work (and be a critical thinkers). Nonetheless, I think it's worth the effort if there are enough students to support the program.

As you know, a large proportion of graduating G&G students end up working in the environmental field -- either engineering or consulting firms -- especially here in Hawaii where there is no oil or mining industry work. In looking at the courses recommended for M GEO (and actually a G&G BSc degree) I see a couple of holes. As geologists in the environmental field, we spend a huge amount of time working with soil and sediment, not just rock and aquifer waters. I believe that an M GEO student on an environmental career path needs education in soils and sediments. G&G is especially lacking in soils training -- I never got any formal education until my PhD work, by taking two soil chemistry courses from TPSS Dept. Traditionally, soil science has been the domain of Ag departments, and geologists have had little or no training -- but that's a big failure -- soil science is
geology in my world. Perhaps a TPSS course, like TPSS 304 (Fundamentals of Soil Science) or TPSS 435
(Environmental Soil Science), should be included in the curriculum.

As for training in sediments, perhaps that’s already taken care of by way of GG309. For more advanced sediment training, with a geochemistry twist, I highly recommend including Kathleen Ruttenberg’s OCN 644 (Sedimentary geochemistry) in the curriculum – it’s super valuable for an environmental geologist’s training. Best would be a G&G course focusing on the interaction of environmental media (rock, soil, sediment, surface water, ground water), a systems approach, to help fill in the missing pieces and develop a well rounded environmental geoscientist.

Companies like Integral would support an internship, we do so in several of our offices each year. The best situation is a student joining as an employee that can work on an existing company projects (and be “billable”). I’ll be glad to discuss further when appropriate.

Hope this helps, and again sorry for delay in responding.

Bill

William Cutler | Principal Scientist
Integral Consulting Inc. | www.integral-corp.com
3465 Waialae Avenue, Suite 380 | Honolulu, HI 96816
Tel: 808.739.7055 | Cell: 808.381.9121 | Fax: 808.739.7059

Informal Market Survey of Alumni and Other Associates. The following email was sent to a list of alumni and associates.

To: Alumni and Friends in Hawaii’s Geoscience Industry
From: Neil Frazer, neil@soest.hawaii.edu
Regarding: Proposed MGeo degree
I’m writing to ask whether anyone in your company is a potential student for a new, professional masters degree program we are trying to establish in the Department of Geology and Geophysics at UH Manoa.

Geology undergraduates could earn this degree with an additional year of study past the B.S. However, we think our largest group of potential customers is working scientists and professional engineers who want to earn a graduate degree in earth sciences without becoming a research scientist. We expect that many, if not most, of these students will be part-time students with full-time jobs.

The new degree will have the name Master of Geoscience (abbreviated as M.Geo.) in order to distinguish it from our existing MS degree, which is mostly concerned with research. The name was chosen for its similarity to the M.Eng. offered by many engineering departments, which is widely recognized as a professional degree.

The program will consist of 12 credits from upper level GG courses not already taken as an undergraduate, and 12 credits from non-seminar GG graduate courses numbered 600 or above. Students who enter with a BS in geology can substitute extra GG graduate courses or upper level courses in departments such as Civil and Environmental Engineering, depending on their needs. University requirements for any Masters degree require a “culminating experience” which, for this degree, will be an oral presentation of a 6-credit geoscience project carried out in connection with their employment.
Proposal for a Professional Master of Geoscience (MGeo)

Each candidate for the MGeo. will be assigned a faculty advisor and co-advisor to help him design a program that meets his professional needs.

Please let me know, frankly, whether this program is of interest to anyone in your company, and what, if anything, we could do to make it better. A few words by email would be most welcome. Thanks for your help.

Here are the responses:

Nice job! I think the hydrographic and marine surveying industries may be good targets for this -- assuming we could teach the sorts of classes they want. Also NAVOCEANO and other Navy groups, and perhaps our NOAA colleagues doing work in the Coral Reef Ecosystem Division and the Marine Sanctuaries program.

Bruce Appelgate, PhD
Director, Ocean Technology Group (OTG)
University of Hawai'i School of Ocean & Earth Science & Technology
1680 East-West Road, Honolulu HI 96822
tel: 808-956-9720 web: http://www.soest.hawaii.edu/HMRG

The program looks good. One suggestion I have is to require a technical writing class and not just an oral presentation, but a written report or final project paper. We constantly have problems with scientists and engineers coming out of the various universities and not being able to write. Since the final product that we give our clients is a written report, it is of utmost importance that our employees are competent writers.

Thanks for the opportunity to look at the program, Jenni

Jennifer Kleveno Hernando
Mountain Edge Environmental, Inc.
62-180 Emerson Road
Haleiwa, Hawai'i 96712
Phone: (808) 637-1200
Fax: (808) 637-0001

Thank you for sending out the letter regarding the professional masters degree. I would definitely be interested in learning more about this program. I have a BS in Geo./Geophys. from U.H. Manoa and have been working for the USGS Water Science Center since 2000. It has always been my plan to continue my studies at some point. However, as you know it is hard to find the time once in career type work positions. Please keep me on the emailing list.

Marciel (Ball) Jamison (U.H. Alumni 1997)
Hydrologic technician
U. S. Geological Survey, Pacific Islands Water Science Center
677 Ala Moana Blvd. Suite 415
Honolulu, HI. 96813
(808)587-2431
mjamison@usgs.gov

This sounds really exciting. I wish this was around when I was thinking about a Masters. I would have seriously considered this program because it doesn't tie you down so much to research, but would broaden horizons in the geophysical world, which is why I am here in the first place.
Proposal for a Professional Master of Geoscience (MGeo)

Melody Studer
808-956-5241 (office)
808-956-5154 (fax)
SOEST, Geology and Geophysics, POST 842B
1680 East-West Rd., Univ. of Hawai‘i
Honolulu, Hawai‘i 96822 USA
mstuder@Hawaii.edu

A Masters of Geoscience degree program would definitely draw interest from our firm's staff. I can think of several people (4+) that would probably be interested in this program, including myself. Thanks for the opportunity to comment.

Scott Moncrief
Project Manager, CH2M
Scott.Moncrief@ch2m.com

I love the idea and would love to take courses to work towards a M. Geo degree. While I was living in CA and working at a geo-technical/engineering firm there were some many options for professional development. When I returned three years ago I was disappointed in knowing that my only chance to do a Masters in Geology was to quit my job and go through a traditional MS program I dismissed the idea of going back to school. I am not part of your target group as I am a middle school teacher but would love to take courses to keep current in the field to be a better teacher.

Mahalo nui loa,
Tina M. Mueller
tinamahina@mac.com

Hey, that degree sounds like a great idea, i personally would love to get involved in a program like that. The M.Geo. degree would hold the same merritt as the regular MS degree right? Please let me know when you are starting this and the entrance requirements.
Thanks, and i hope the program makes it, one more year for a Masters would be great.

Michael Smith
Mikhael Smith Consulting
mdsmith@Hawaii.edu

Thank you for including alumni such as myself in your investigation into the viability of a M.Geo. program. Before I proceed with my comments, I should state up front that I am not working in industry, but neither am I a (strictly-speaking) a researcher, though I hold a Ph.D. degree (I'm employed by the Pacific Tsunami Warning Center). That being said, I do know people who work in industry (esp. environmental) who would be among your targeted M.Geo. candidates, and feel I have some insight into what they might feel about what this program would offer.

You specifically state that your best candidates for the M.Geo. program would be people already working in industry who hold a bachelor's degree. I'm not sure that would be true. You are proposing a one-year program (24 credits including the oral presentation, if I understand this correctly), but if the student is attending part-time, this degree will take considerably longer, possibly reducing its appeal. Furthermore, you suggest that the student's project would be work-related, yet under the supervision of a pair of G&G faculty members. A seasoned employee in a given field is likely to feel that they and their supervisor(s) are the experts of their current line of work, and since (please correct me if I'm wrong!) G&G doesn't have many faculty members with recent industry experience, such a potential student may need some convincing that a member of the G&G faculty knows more about their job than they do. Possible exceptions to this would be someone who's still pretty green (e.g., less than a year's experience), someone looking to change jobs (in which case, they...
need a project at their new job), or someone needing the credentials for a promotion or to start a consultancy.

I do think, however, that the M.Geo. program will appeal to current undergraduate students who would be willing to attend school an extra year in exchange for a higher degree and industry experience. This would be especially true if the M.Geo. program could be manifested as some sort of internship program with local companies (also common in engineering programs). This would not only appeal to students already enrolled, but expand the appeal of the undergraduate program in general. An incoming or current student would know that they had the option to gain industry experience and the chance to get their "foot in the door" with industry upon graduation with the higher degree. Furthermore, it would help the department gain some outreach to local industries, and if some kind of internship program is developed, then even long-term professional relationships could be forged between faculty members and industry specialists (thus eventually removing one of my suggested obstacles in the previous paragraph). And just as as side note—in the past the G&G department tried to enhance its enrollment by allowing undergraduates to specialize early in the program, which resulted in graduating students with specializations but also with deficiencies. The M.Geo. would appeal to these same students, give them the specialization they need, but without sacrificing other areas of a "classic" geoscience undergraduate curriculum.

So, in short, I think the M.Geo. program is a fine idea. I just think that you'll have better luck finding your M.Geo. candidates from within the G&G program than without. Thank you for your time,

Nathan Becker

As someone who pursued and received my MS in Geology & Geophysics there while working full-time as an Active Duty Army Officer, I say it sounds like a great plan! The late night research and hours in the labs killed me when I put on my uniform early every morning. If you need more than encouragement, let me know!

LTC Joseph L. Ingignoli
Commander
7th Squadron, 6th Cavalry (ATK HEL)
4724 South Parkway
Conroe, Texas 77303-4355
(936) 525-3385
joseph.ingignoli@us.army.mil

I think that this is a great idea and am definitely interested in the program. I would hope that you will have enough response to make this a reality. I graduated in 1987 with a BS geology and geophysics degree, but have not had time to go back and get the masters due to steady work as a consultant.

Working in the consulting realm actually presents some projects that would make a good "culminating experience". I am especially interested in groundwater flow within the caprock for instance, and have several projects that would make for interesting study.

Please include me on the mailing list for any further updates on the program.

Marc Dexter, PG, REM
Project Manager
CH2M HILL, Honolulu Office
Proposal for a Professional Master of Geoscience (MGeo)

1585 Kapiolani Boulevard Suite 1420
Honolulu, Hawai‘i 96814
(808) 440-0248 phone
(808) 945-7248 fax
(808) 864-3591 cellular
marc.dexter@ch2m.com

I like the sound of this new professional degree. I have a few questions,

1st: When would the program start?
2nd: Will this program use the same entrance requirements as a master’s degree? (i.e. GRE scores)
3rd: Will the program require the student to be already employed, or is there a group of companies that are willing to work with the program that the department had in mind?

I am personally very interested in this degree. On a more collective level, I believe that this professional degree is a wonderful idea. It will strengthen the bridge between academia and industry which seems to be missing currently in GG. Also, I will talk to a couple of my undergraduate colleagues that I know are interested in going more the direction of industry after they graduate their thoughts on this degree.

Benjamin R. Sellers
Undergraduate/Research Assistant
Department of Geology and Geophysics:
Volcanology Division
S.O.E.S.T.

Thanks very much for the information. You are correct in your conclusion that a significant proportion of GG alumni have taken the industry route rather than academic route. For those of us that chose the former, the transition to the environmental industry was quite challenging. This proposed focused degree would be good for all involved: it would make the transition easier for the future graduates, it would provide those of us already in the industry with new hires that are more prepared for the different demands, and it would hopefully attract a larger pool of students to GG or SOEST.

My own experience with hiring alumni from the various branches of UH geosciences has mostly been good so far, but like anything else, can get better. My own specific suggestions deal with largely non-technical topics, as the graduates in general have had a good grounding in the sciences. The following are my specific suggestions:

1) Training in business aspects like project management or cost accounting. I would agree very much with those that would conclude that these topics are not technical and that they would very likely not be of great interest (if at all) to most students going into the geosciences. On the other hand, my own experience is that these represent a significant proportion of work in an industry setting. I will go even farther to say that while such skills may not be immediately essential to an entry level candidate, very few will be able to advance very far in industry without them. While Civil Engineering has some aspects of this built-in to their technical curriculum, there was nothing equivalent in the geosciences when I was in the program (admittedly, this was sometime in the early Bronze Age). Our experience with recent graduates suggests that this has not changed.

2) Most industry work absolutely requires a firm knowledge of focused regulations and/or laws. By example, I am convinced that our own field of environmental remediation would not exist if environmental laws did not exist, as well. As with business/management training, this was nowhere part of the GG curriculum in the past and I am not aware if this has changed recently.
Proposal for a Professional Master of Geoscience (MGeo)

3) The third point deals with a more general aspect that I am sure you have already experienced. Have students take more classes that are writing-specific or -intensive to develop their skills of expression. There has been a rather startlingly wide range in the demonstrable writing skills of recent graduates.

Thanks for the chance to give input and I would be very interested to see where this goes. I hope things are well with you.

By the way- if the response to your message is a little light overall, it may be that some recipients will have the message flagged as "spam" by their operating systems and delete them without knowing. As you can see, that was the case with me, and I almost deleted the email until I recognized your name.

Bruce Tsutsui
Environmental Science International
56 Oneawa Street Suite 103
Kailua, HI 96734
Phone: (808) 261-0740
Fax: (808) 261-0749
Cell: (808) 864-4563
Email: btsutsui@escienciie.com

I’m finishing my Masters in Geological Engineering from the University of Nevada, Reno. This new masters of geoscience sounds very interesting and exciting.

Here are my concerns:
-What are Hawai‘i’s requirements for an engineer intern license? In Nevaca and Illinois (where I currently live), in order to take the licensure exam, you must have a degree in engineering from an ABET certified school. I know the Engineering School at UH is ABET certified but SOEST is not. This changes the minimum requirements (i.e., years of graduate school and/or years of experience) needed to take the exam and to eventually become certified as a Professional Engineer.
-What are Hawai‘i’s requirements to become a state certified geologist? In Illinois, you must work with a state certified geologist for x-many years before qualifying to take the exam.
-How many engineering firms in Hawai‘i employ staff geologists? I think they are getting away with only geotechnical (civil) engineers.
-I am currently not on track for a research scientist position but I worked as a junior engineer in Reno and now as an assistant to a fluvial geomorphologist. My employers are puzzled that I did not take a groundwater hydrology course (a requirement course for the masters in geoscience?).
-Perhaps students enrolled for the masters of geoscience should be paired with someone in industry? I realize that graduate students should be aware of the paradigms in research but they (I) lacked some essential skills needed in the field (e.g., field mapping, photogeology, GIS, AutoCAD). Although a masters degree on your resume looks great, marketable skills (programming, familiarity with computer software used in industry) are also a plus (as well as experience).
-How many UH undergraduates go on for a graduate degree? How many in the field of geoscience? Mike Dahilig was in my graduating class and he’s graduating with a law degree. More effort needs to be made to get undergraduates interested in research and/or exposed to graduate school opportunities. Not much effort was made to retain graduating undergrads at UH graduate students. I wasn’t sure exactly what I wanted to pursue until my senior year, when it was too late to start a senior thesis project.

Again, just some thoughts. Please feel free to contact me if you have any more questions.

Kimberly "Kimi" S. Arata
Assistant
Little River Research & Design
www.emriver.com
Proposal for a Professional Master of Geoscience (MGeo)

618-203-1837

Thanks for passing this information on to me. I will spread it around to my people and my clients I come in contact with. It seems like a good deal to me. I have been in full support of UH offering more classes and degrees for people wanting non-research jobs. I would say 90% of all non-academic geology jobs here in Hawai'i are in the environmental field, yet UH doesn't prepare their graduates with courses for this field of work. It makes no sense to me. Maybe this masters program will allow geology grads to focus more in this area to prepare them for the job market in Hawai'i. I will let you know if I talk to anyone interested.

Dave Davis
ESN Pacific
1818 Kahal St. Honolulu, HI 96819
T 808-847-0067
F 808-847-0917
email: esn@esnpacific.com

The program sounds quite good—particularly in that the 'culminating experience' final project will be derived from the workplace, tying together the practical and academic parts of the degree in a way that should benefit both the student and employer. I think if the program had been available at the time of my graduation I might have taken a job with a local firm and gone for it.

Eden Jael Feirstein
Dept. Hydrology & Water Resources
Harshbarger Building Rm. 322A
University of Arizona
Office Tel: 520-621-7115

I received a memo from you regarding a proposed masters program, M.Geo, and I am interested in pursuing a masters. I graduated from G&G in May 2004 and I have been working for Earth Tech for a year. I would like to get a masters degree in Geology, but with this new possible option, M.Geo, I am not sure which way to pursue my interests. I would also be very interested in the MS degree also. Please e mail me, or call me at the below numbers with more information, or let me know when a good time to come by POST would be.

Carrie Plath
Earth Tech, Inc.
841 Bishop St. Suite 500
Honolulu, HI
96813
P 808.356.5363
F 808.523.8950
R 808.523.8874
carrie.plath@earthtech.com

As a recent UH B.S. Grad, I would be very interested in this program. I am currently working with Mountain Edge Environmental, Inc. The program sounds excellent; however, I do believe that a technical writing course should be required as well as a final paper. My personal challenge for this program is my husband is military and he is up for a duty change at the end of 2007. I am not sure if this program would be in effect before I left, but if so...SIGN ME UP!

Angela Peltier
Mountain Edge Environmental, Inc.
62-180 Emerson Road Haleiwa, HI 96712
Cell Phone: (808) 551-3740 Phone: (808) 637-1200 Fax: (808) 637-0001

-44-
Proposal for a Professional Master of Geoscience (MGeo)

I am writing to express my interest in the proposed M.Geо Degree discussed in your letter on the Department's homepage.

I am Professional Geologist presently working for a geotechnical consulting firm in California. I currently have a Post Graduate Diploma in Engineering Geology from the University of Canterbury in New Zealand. The Diploma represents one year of post-grad course work in subjects related to engineering geology.

Although my present expertise is in the field of engineering geology, I am very interested in active volcanism and I plan to apply to the University of Hawai'i as a graduate student. I hope to start studying next spring.

My long term goals are to teach, conduct research, or work for a government agency in a scientific role. Would the proposed M.Geо degree be suitable for someone with my background and aspirations? Would the M.Geо be suitable preparation for moving on to a Ph.D.?

I appreciate any advice or information you can offer.

Mark Davis, PG., REA.
geojobhunter@yahoo.com
805 794 5750
geojobhunter@yahoo.com

Have you made any progress on getting this program set up? I am definitely interested in the program. I believe there may be one or two other individuals in our office interested as well.

I certainly hope that enough folks are interested that the program will get initiated. We have very few opportunities here in Hawai'i for additional training or workshops, and this would be a good way to really get some focused study. It also seems that it would be a good way to infuse some of the practical information gathered in the consulting world into the geology program at the UH - a way for those of us that have been out there working to share information/experience we have gained on projects with others in the geology program.

Thanks,
Marc Dexter,
RG Project Manager CH2M HILL, Honolulu Office New Address and Fax!
1132 Bishop Street Suite 1100 Honolulu, Hawai'i 96813 (808) 440-0248 phone (808) 538-8248 fax (808) 864-3591cellular marc.dexter@ch2m.com

Is it too late for me (and/or the PTWC) to help you make this new Degree program a reality? I for one would be very interested! I'm sure that we could get Chip or Stu to write up a Letter of Encouragement, or whatever would help.

Barry Hirshorn
Pacific Tsunami Warning Center

I am writing to obtain more information about the Master of Geoscience that was posted on the G&G website.

I graduated from the University of Washington, School of Oceanography with a degree in Marine geophysics. For the last two years I have been working as a data processor for a small company in Seattle, WA that specializes in marine survey's using primarily sidescan and interferometry. I am currently looking to go back to school in a related field of study and the brief description that you gave in your memorandum sounded intriguing.
Proposal for a Professional Master of Geoscience (MGeo)

Am I qualified for the M.Geo. program? If so, where can I find more details about it?

Curtis Clement
Marine Geophysicist
Williamson & Associates
206-285-8273

I'm Tracy Ibarra and currently a senior in the G & G undergrad B.S. program. I am expected to graduate Spring 2008. I am interested in a professional degree and was hoping that the department was offering a program for it.

Currently, I work for the U.S. Geological Survey Water Resources Division in Honolulu. I have been an employee here since May 2005 under their Student Career Employment Program. The USGS and the university have a joining contract to employ me as a student until 2010. I would like to earn a professional degree with a focus on what I do here at the USGS, but do not know how to go about it or what the grand details are. Suggestions?

Tracy Ibarra
Appendix 3. Survey of Current Undergraduate Majors

The following was emailed or handed to our 45 current undergraduate GG majors

Survey of Undergraduate GG Majors on Career Plans and Potential Interest in the Proposed Professional Degree

"Masters in Geoscience (M GEO)"

Department of Geology and Geophysics
School of Ocean and Earth Science and Technology

University of Hawaiʻi at Mānoa

February 2011

Instructions: Please read through the first 4 pages and answer the questions on the last page
Geoscience Starting Salaries for 2010 Graduates

According to data collected by the National Association of Colleges and Employers in their 2010 Fall Salary Survey, starting salary offers for geoscience graduates were highest for those graduating with geoscience-related engineering degrees (e.g. petroleum engineering, mining engineering, and environmental engineering). Geoscience-related engineering bachelor's graduates received average salary offers ranging between $55,491 for environmental engineering to $77,278 for petroleum engineering graduates. Geological and related sciences bachelor's degree recipients average salary offers were $37,431 which was on par with chemistry and some humanities disciplines (e.g. History, English, and Political science), and more than $10,000 lower than graduates from Mathematics ($49,489) and Physics disciplines ($52,487).

A Master's degree is required for most geoscience occupations. Starting salary offers in 2010 for geological and related sciences averaged $56,689 for Master's degree recipients and $56,625 for doctorates. In geoscience-related engineering disciplines, salary offers for Master's degree recipients ranged from $86,769 for mining engineering to $98,000 for petroleum engineering.

- Leila Gonzales

www.agiweb.org/workforce/  workforce@agiweb.org
Employment in geoscience-related occupations is expected to grow about 23 percent between 2008 and 2018, which is much faster than the average growth of all U.S. occupations (10%). Environmental engineers are expected to see the largest growth in number of new jobs with a 31 percent growth rate, while geoscience engineering managers are expected to see the smallest growth at 10 percent.

Employment growth for aggregated geoscience-related occupations will be most robust in the professional, scientific, and technical services sector (50%) and the waste management sector (32%).

Note that these projections do not factor in replacement needs due to attrition.

Geoscience Currents Discussion Webinar:
Salary Trends and Employment Projections for Geoscience Careers
October 3, 2011, 1:15 p.m. EDST
Listen to an in-depth discussion of Currents #49-53
Participation in the webinar is free

Register at www.agiweb.org/workforce/webinars.html

- Lella Gonzales
Proposal for a Professional Master of Geoscience (MGeo)

Summary of Proposed Professional Degree Program: Master's in Geoscience (MGeo)

The MGeo is for students who wish to pursue or are already pursuing careers in industry, rather than research in fields such as:
- Environmental consulting, environmental engineering, environmental geology
- Engineering geology, geotechnical engineering, and offshore surveying
- Hydrology and water resources
- Natural hazards mitigation and adaptation
- Climate change adaptation
- Petroleum and gas exploration, including offshore exploration
- Economic geology and mining
- Renewable energy technology (e.g., biofuels, solar,
- Intermediate or high school education

Distinguishing Features
• Five-year masters: The MGeo can be completed in one year beyond a B.S. degree in geology and geophysics. It is therefore possible for an entering undergraduate freshman to earn a B.S. GG in four years, followed by an MGeo degree in one more year.

• The MGeo degree differs from GG’s M.S. degree by emphasizing coursework in applied geoscience and in providing practical work experience as a volunteer, intern, or employee of a company or agency, rather than a research thesis.

• MGeo students will pay tuition. Unlike M.S. students, MGeo students will not be eligible for research assistantships and tuition waivers.

• Key courses will be taught during the evenings or weekends, or include online content (e.g., lectures or recordings of lectures posted online) so they will be more available to working professionals.

Who Can Apply? Anyone with a B.S. in any field, or a B.S. or B.A. in geology and geophysics, and anyone who has taken their GREs.

Course Requirements
30 credit hours total: up to 18 credits can be taken from the following upper-level undergraduate courses, provided they were not taken for the B.S.

Hawaiian Geology (GG402)
Geological Data Analysis (GG413)
Marine Geology (GG423)
Environmental Geochemistry (GG425)
Geophysical Methods (GG450)
Hydrogeology (GG 455)
Engineering Geology (GG454)
Geological Remote Sensing (GG460)
Geospatial Information (GG461)
Fluid Mechanics (CEE 320)
Geotechnical Engineering (CEE 355)

A total of 6 credits can be for the work-study requirement (GG750 MGeo Professional Project). A minimum of 12 credits should be in courses numbered 600 and above, excluding GG750. GG740 (MGeo Seminar, 1 credit hr) must be taken once a year.

-50-
Proposal for a Professional Master of Geoscience (MGeo)

Culminating Experience

Students are required to do a work-related project either as an intern, volunteer, or employee of a local company or agency. The culminating experience will involve a written report or technical paper as well as oral presentation on their work. The oral presentation can be made at UH or at the location of the sponsoring organization. A total of credit hours must be taken in GG750 (MGeo Professional Project) for this project.

Hypothetical Full-Time Schedule for an MGeo in 1 Year After the B.S.

<table>
<thead>
<tr>
<th>Fall Courses</th>
<th>Credits</th>
<th>Spring Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG605 (Engineering Geology)</td>
<td>3</td>
<td>GG600 (Equations of Geophysics)</td>
<td>3</td>
</tr>
<tr>
<td>GG413 (Geological Data Analysis)</td>
<td>3</td>
<td>GG652 (Gravity, Magnetics, Heat flow)</td>
<td>3</td>
</tr>
<tr>
<td>GG425 (Environmental Geochemistry)</td>
<td>3</td>
<td>GG455 (Hydrogeology)</td>
<td>3</td>
</tr>
<tr>
<td>ENG308 (Technical Writing)</td>
<td>3</td>
<td>GG740 (MGeo Seminar)</td>
<td>1</td>
</tr>
<tr>
<td>GG640 (Coastal Geochemistry)</td>
<td>3</td>
<td>GG750 (MGeo Professional Project)</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>15</strong></td>
<td><strong>Total:</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

Do the work project as volunteer, intern, or employee in:
* summer prior to above coursework to graduate in Spring, or
* summer after above coursework and graduate Summer or Fall of 3rd semester.

Hypothetical Half-Time Schedule for a 2-year MGeo (for working professionals)

<table>
<thead>
<tr>
<th>Year 1 Fall Courses</th>
<th>Credits</th>
<th>Year 1 Spring Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG740 (MGeo Seminar)</td>
<td>1</td>
<td>GG413 (Geological Data Analysis)</td>
<td>3</td>
</tr>
<tr>
<td>ENG308 (Technical Writing)</td>
<td>3</td>
<td>GG455 (Hydrogeology)</td>
<td>3</td>
</tr>
<tr>
<td>GG605 (Engineering Geology)</td>
<td>3</td>
<td>GG461 (Geospatial Information)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>7</strong></td>
<td><strong>Total:</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

Work project as a volunteer or intern done in summer, or as an employee throughout the 2 years.

<table>
<thead>
<tr>
<th>Year 2 Fall Courses</th>
<th>Credits</th>
<th>Year 2 Spring Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG605 (Engineering Geology)</td>
<td>3</td>
<td>GG740 (MGeo Seminar)</td>
<td>1</td>
</tr>
<tr>
<td>GG640 (Coastal Geochemistry)</td>
<td>3</td>
<td>GG652 (Gravity, Magnetics, Heat flow)</td>
<td>3</td>
</tr>
<tr>
<td>GG750 (MGeo Professional Project)</td>
<td>2</td>
<td>GG750 (MGeo Professional Project)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>8</strong></td>
<td><strong>Total:</strong></td>
<td><strong>7</strong></td>
</tr>
</tbody>
</table>
Proposal for a Professional Master of Geoscience (MGeo)

Survey Questions Please return this page to Evelyn in POST 813, or reply to your email from gito@hawaii.edu on 2/24. Claim your gift certificate to Da Spot (3 locations: near Kuykendall Hall, Paradise Palms, and King St near Down to Earth) from POST 813

1) Why did you decide to become a GG major, & how important was career consideration in your decision?

2) Yes or no: Are you seriously considering pursuing a career in the geosciences? If “no”, how (if at all) has your experience as a GG major influenced your career interest. If “yes”, what type of career in geosciences most interests you?

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. a) Not at all interested; b) Moderate-to-low interest.; c) Moderate-to high interest; d) Really, really interested. Please give a brief explanation for your choice:

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.
Proposal for a Professional Master of Geoscience (MGeo)

We received 27 responses for a return rate of 60%.

Here are those with responses of “d) Really, really interested” about apply to the MGeo program (question 4).

1) Why did you decide to become a GG major, & how important was career consideration in your decision?
   Lots of work done outside, need the geologist is high and I believe will increase.

2) Yes or no? Are you seriously considering pursuing a career in the geosciences? If “no”, how (if at all) has your experience as a GG major influenced your career interest. If “yes”, what type of career in geosciences most interests you?
   
   MIning / Geotechnical

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?
   NO

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. a) Not at all interested; b) Moderate-to-low interest.; c) Moderate-to-high interest; d) Really, really interested? Please give a brief explanation for your choice:
   I am really interested, however it has been 5 years in college and I would like to take a break from schooling and try to pursue a career. It would have really helped if this was available and I knew about it a few years ago.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.
   I really believe that this program should have been available a long time ago. Other than that it's a great program.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, and how important was your career considerations in your decision?

I decided to become a GG major because I enjoyed learning about earth processes and I wanted a career where I could work outside.

2) Are you seriously considering pursuing a career in the geosciences? (yes or no)

Yes

2b) If “yes”, what type of career in geosciences most interests you?

Coastal geology interests me most, as I have gained experience in this field working for Chip Fletcher. I still enjoy working outdoors, but I have also developed an interest in remote sensing. I would like to have a career working for a government agency or private industry.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?

Yes, Geology and Geophysics for M.S. degree

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.

d) Really, really interested

The degree interests me because it will only take 1 additional year after getting a B.S. in GG. Also, I like that it is geared towards applications of geoscience and doesn't require a research thesis.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.

I'd like to know how the written report/technical paper that is required is different from a thesis.
1) Why did you decide to become a GG major, and how important was your career considerations in your decision? I became a GG major due to my love of science in general and interest in earth science in particular. My reason for returning to college was to obtain the necessary requirements to have a career in the sciences, so career considerations were taken into account.

2) Are you seriously considering pursuing a career in the geosciences? (yes or no) Yes

2b) If “yes”, what type of career in geosciences most interests you?
A career in hydrology is what I hope to pursue further. However, the figures on environmental engineers are interesting.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field? Yes, I have already applied for an M.S. degree in Environmental Geosciences at SUNY Buffalo. This program includes hydrogeochemistry and hydrology which I am looking to specialize in.

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.

   d) Really, really interested, with a caviat. In my current situation I am moving back to the mainland for family reasons, so I wouldn't be able to stay in the area to attend. However, with that said, I wish that wasn't the case because this would fit perfectly with my career goals I think. As I am not looking to pursue an academic career, the integration of the practical work experience into a program of study is invaluable and highly attractive to me. Also the inclusion of engineering into the program is attractive given the job outlook figures for environmental engineering.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscientific related careers in industry but not research.

   Given the trends in geengineering, be sure the engineering curriculum is adequate to be competitive (not sure if what's provided is or isn't, just a general statement). With that said, I know for the undergraduate degree the amount of math we are required to take might not be enough for those wanting to pursue the engineering/hydrology aspects competitively. For example I have been told to take on additional math courses to beef up my CV for graduate school, which I have. So I would suggest that the "five year masters track" ensure the undergraduate part is maybe tailored a little more then the general GG degree track currently is. Otherwise I think it fits perfectly with the purpose from my perspective as someone that would be interested to attend a program like this if it were possible.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, and how important was your career considerations in your decision?

When I was a freshman, I took several classes in many different fields (humanities, social sciences, art, etc.). I was bored. I always loved science in high school, so when I took 100 level courses in geology and astronomy I realized I was excited to do the homework, hands on activities, and to go on all the field trips. It was fun! I talked about the things we were learning in class to my friends all the time. My parents told me to choose something that interests me, and it became obvious that I loved geology. I also have to credit some of the professors because I admired their enthusiasm. Honestly, I didn’t think further than a bachelor’s degree because I always take one step at a time and I didn’t know if my mind would change after several years.

2) Are you seriously considering pursuing a career in the geosciences? (yes or no) YES

2b) If “yes”, what type of career in geosciences most interests you?

Natural hazard mitigation and adaptation

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?

Applying for grad school has been on my mind before I read the above information. If I could continue to go to school after I graduate I would do it in a heartbeat! I want to go to school in the natural hazard mitigation field.

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.

d) Really, really interested **** I am very interested in the MGeo program. It sounds like a great program for industry and I wish I could apply for it. Unfortunately, my GPA is lower than 3.0 and I will be a BA graduate this spring. I will do research on the MGeo program and see what I have to do or what needs to be done in order to be qualified for it.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.

I honestly do not have any recommendations because this is the first time I’ve heard of MGeo.
1) Why did you decide to become a GG major, and how important were your career considerations in your decision?

I was not sure what to major in after my first two years of college. I took the GG 100 class and I thought it was very interesting so decided to major in GG. Much like deciding what my major was, my career considerations are scattered. I am not completely sure if geology is the right thing for me to pursue after graduation mainly because I do not know what type of geology job I can get.

2) Are you seriously considering pursuing a career in the geosciences? (yes or no)

Most likely yes. I like remote sensing. I also liked working with ArcGIS, and could see myself doing something involving that program.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?

Yes in Geology but I did not want to travel out of state and the M.S. and Ph.D. program we currently have does not seem to be the right fit for me. I was thinking it would be a few years before I would go to graduate school somewhere else.

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.

d) Really, really interested

This program is exactly what I have been looking, and I hope it gets put into place soon.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.

From what I read I think the program will be a huge benefit to students. I do not know if night classes would help students at all because they are transitioning from fulltime undergrad classes anyways.
Proposal for a Professional Master of Geoscience (MGeo)

Here are those with "c) Moderate-to-high interest" in apply to the MGeo program (question 4).

1) Why did you decide to become a GG major, and how important was your career considerations in your decision?
I decided to become a GG major because I knew there wouldn't be much retirement or social security when I get older so I wanted to find a field that I could be passionate about for the entire length of a very long career. Another reason I decided on this field was that sea level rise, peak oil and climate change are going to become more of a problem which translates to a lot of jobs for people in this field.

2) Are you seriously considering pursuing a career in the geosciences? (yes or no)
Yes
2b) If "yes", what type of career in geosciences most interests you?
Consultant on coastal geology or disaster mitigation

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?
Yes, I think I want to pursue coastal geology or disaster mitigation

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.
c) Moderate-to high interest. I was very interested until I read that tuition is fully covered by the student. I feel like it's really important to work closely with a mentor to gain experience. It doesn't sound like this program focuses on research.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.
I: sounds like a trade school type certification rather than a masters degree. Would the degree look promising to employers?
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, and how important was your career considerations in your decision?

I decided to become a GG major because I was interested in mineralogy/geology area from when I was a kid and I liked nature and rocks. My career considerations went as far as being able to easily (relatively) to find a job related to a nature field. But beyond that not really.

2) Are you seriously considering pursuing a career in the geosciences? (yes or no)
yes
2b) If “yes”, what type of career in geosciences most interests you?
the type of career in geoscience would be geohazards/computer work in geology probably modeling.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?

Yes, for an M.S. degree but not right away and in the geology/geos area most likely.

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.

c) Moderate-to high interest.
the reason for this is because of the possible applications and generally short time frame to acquire another achievement for only about 1-2 years more.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.

not sure if there is any possible change that could be made to the field to make it more relevant to serve students in geoscience related careers in industry as may of those classes exemplify what could be possibly be used in industry. Though it seems to be a very tight fitting program.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, and how important was your career considerations in your decision?
I decided to become a GG major because I had an interest in the earth sciences and was interested in getting into some sort of geological engineering position, but in reality, any job where my degree is even slightly relevant was important to me.

2) Are you seriously considering pursuing a career in the geosciences? (yes or no)
Ideally, yes.
2b) If “yes”, what type of career in geosciences most interests you?
Geological engineering, working for an engineering firm, or a few from that list on the survey.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?
no

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.
Moderate to high interest

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.
Have possible internships available to the students coming into the MGeo program.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, and how important was your career considerations in your decision?
I decided to become a GG major because I originally went to school for mechanical engineering and didn’t see myself doing it as a career, but immediately switched to GG when I took a GG 101 class for an earth science credit. I always wanted a career I enjoyed, versus one that would make me more money, so once I realized I love geology it was an easy choice.

2) Are you seriously considering pursuing a career in the geosciences? (yes or no)------- Yes
2b) If “yes”, what type of career in geosciences most interests you?
I still have almost a year until I graduate, but alternative energy, especially geothermal, is what I would ideally like to be doing for a career.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?
No, I was content with my B.S. degree and was planning to seek employment in a geo-related field.

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.

   c) Moderate-to high interest.
I was not prepared to spend another 2 years in school pursuing a M.S., and I was leaning towards a career in the industry rather than research based, so the short time span of the program and it’s focus on industry are what interest me.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.
Perhaps if a specific class was offered to teach what industry standards are versus what is expected in a research field.
My one concern is if this is truly a Master’s program? The degree title would be MGeo, not M.S.? I worry that many employers would wonder about what exactly the degree entailed, whereas a Master’s curriculum is fairly known.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, and how important was your career considerations in your decision? I decided to become a GG major because of my interest in volcanoes. I found them fascinating, and was thrilled to find out that I could actually get a degree in studying them. My parents have always supported what I do, and having a career was not something I thought about when I first wanted to do volcanoes. It was always assumed that I would get a PhD and become an academic professor eventually, so career and money-wise, they were never really considered in my decision to become a GG Major.

2) Are you seriously considering pursuing a career in the geosciences? (yes or no) Yes, I am. Very serious.

2b) If “yes”, what type of career in geosciences most interests you? I am interested in volcanoes, as I previously mentioned, with hopes of being able to apply studies in volcanology to hazard management and mitigation in the future. If you can remember what Pierce Brosnan did in "Dante's Peak", that's what I want to do. I want to apply my knowledge in hopes of helping people and society in the future.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field? Before reading the information, I was already considering graduate school for Ph.D. Currently I am not sure exactly what field in volcanology, because I have two offers, both differing. One is research in physical volcanology, while the other is in the geochemical aspect of volcanology. Either one interests me, as long as it has to do with volcanoes :)

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.

   c) Moderate-to high interest. My interest level would be option c) Moderate to high interest. I have never really considered industry jobs before, because the only ones I've been aware of are the petroleum industry jobs and environmental consultant jobs, neither of which appeal to me. The brochure, however, mentions that there are possible jobs in natural hazards mitigation and adaptation, something that seems like it might be down my alley. I find that having hands-on, practical experience definitely helps with getting jobs, as well as being able to migrate between jobs in different sectors. The MGeo program seems to offer classes that will build on these skills, thus allowing me, if I was in the program, to be versatile and be a good candidate for jobs.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research. I was going to say an internship somewhere would help, but that is already included in the plan. Maybe a course in public speaking? I know that in the industry it would probably be a lot of reports to write etc., but sometimes the industry will need to talk to the public. A course in public speaking, and communicating industry related activities to the public? PR always seems to be a big deal in the industry (look at the BP oil spill), and if scientists themselves knew how to present themselves, etc. this might make them more attractive to people looking to hire them in the industry? That is all I have though, because the spread of courses look like they cover the necessities.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, and how important was your career considerations in your decision? *I have had the opportunity work closely with geologists during my work in oil and gas production and developed an interest in the subject. Becoming a GG Major was bureaucratically necessary to get access to labs and computer necessary to complete course work.*

2) Are you seriously considering pursuing a career in the geosciences? (yes or no) Yes

2b) If “yes”, what type of career in geosciences most interests you? *Management or technical position in renewable energy startup with focus on geothermal or biofuels*

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field? *Have an MBA, but would not consider MS or PHD at SOEST due to research focus.*

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.

   c) Moderate-to high interest. *Given that you have an evening and weekend focus, you provide a unique and very, very valuable opportunity for engineers and scientist (from other disciplines) to re-tool skills.*

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.

   *After working in oil and gas production and renewable energy for many years, I am not sure that these course offerings would have helped me with those jobs. Someday our state will tap geothermal resources, and course work in that area would be a plus and could get some hands on opportunities in play.*

-63-
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, & how important was career consideration in your decision?
   I wanted to work in the field of hydrogeology so career consideration was the basis of becoming a GG major.

2) Yes or no: Are you seriously considering pursuing a career in the geosciences? If “no”, how (if at all) has your experience as a GG major influenced your career interest. If “yes”, what type of career in geosciences most interests you?
   Yes. Hydrogeology

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?
   No

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program.  a) Not at all interested; b) Moderate to low interest.; c) Moderate to high interest; d) Really, really interested. Please give a brief explanation for your choice:
   c) - I need to work as soon as I graduate. I would love to do the MGeo program but financially I'm not sure I could do it.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.
   Sounds great.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, & how important was career consideration in your decision?

I wanted a career that I can also help to keep to my native roots (Hawaiian). Hawaiian's believe that land is our ancestors, by becoming a Geologist I am able to educate us with cultural geology (Hawaiian Geology).

2) Yes or no: Are you seriously considering pursuing a career in the geosciences? If "no", how (if at all) has your experience as a GG major influenced your career interest. If "yes", what type of career in geosciences most interests you?

Yes, Mostly in Volcanology/Hydrology (mostly Eruptions).

Combination of Modern Science & Cultural Science.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?

Yes, Volcanology/Hazards from a Cultural aspect (a bit of Hawaiian Studies).

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGEO program. a) Not at all interested; b) Moderate-to-low interest; c) Moderate-to-high interest; d) Really, really interested. Please give a brief explanation for your choice.

C. I want to, but I'm still trying to get through my undergrad. And I'm currently finding out that this major is difficult, harder for me to understand (Modern Science).

5) What recommendations might you have for making the MGEO degree more relevant to its intended purpose: some students interested geoscience related careers in industry but not research.

I recommend to do it if that's your interest. But if not, then there are other ways.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, & how important was career consideration in your decision?
   I became interested in earth science and former physics teacher from high school suggested that I become a geology major. From there, I decided to become a GG major. Career consideration was important in doing what I do and wanting to do what I've always looked forward to.

2) Yes or no: Are you seriously considering pursuing a career in the geosciences? If “no”, how (if at all) has your experience as a GG major influenced your career interest. If “yes”, what type of career in geosciences most interests you?
   Yes. A career I would like to do would be a focus on either volcanology or seismology. I'd like to research and learn more about volcanoes or tsunamis, etc.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?
   Yes. In volcanology, seismology (geophysics).

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. a) Not at all interested; b) Moderate-to-low interest.; c) Moderate-to high interest; d) Really, really interested. Please give a brief explanation for your choice: Moderate-to-high interest. This is because the courses needed interest me and I'll be taking some of them anyway. Also, it only takes a year or two to get your diploma.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.
   Maybe have a range or demonstrate different careers that you can get into with an MGeo degree.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, & how important was career consideration in your decision?

I wanted to be a GG major because I knew women in science are needed and I would be able to find a well-paying job.

2) Yes or no: Are you seriously considering pursuing a career in the geosciences? If “no”, how (if at all) has your experience as a GG major influenced your career interest. If “yes”, what type of career in geosciences most interests you?

I have not decided if I would like to be in the geosciences or not. It would depend on job opportunities and salary - compared to other affairs I have. I am not excited about geology but I would certainly take a job in it if it looked promising.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?

No! I did not want a research focus since I didn't really want to be in academia. I also didn't want to keep going to school immediately.

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. a) Not at all interested; b) Moderate-to-low interest; c) Moderate-to-high interest; d) Really, really interested. Please give a brief explanation for your choice:

I think this program looks excellent and will help to get jobs, but I am unsure how recognized it is among employers.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested in geoscience-related careers in industry but not research.

I like the course work and plan what you have.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, & how important was career consideration in your decision?

   I became a GG major by accident, but I really like it. A career in the field was a very important consideration.

2) Yes or no: Are you seriously considering pursuing a career in the geosciences? If "no", how (if at all) has your experience as a GG major influenced your career interest. If "yes", what type of career in geosciences most interests you?

   Yes, I am very interested in mining, but I know there isn't much places to do that in Hawaii. My second choice is environmental geology.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?

   I do not want to go to graduate school.

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. a) Not at all interested; b) Moderate-to-low interest; c) Moderate-to high interest; d) Really, really interested. Please give a brief explanation for your choice:

   C. I would like to take the courses. But I feel it would help in the real world. It also looks better than just a BA.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.

   I really do not want to do research. So I feel the program is good. I don't think I would change anything.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, & how important was career consideration in your decision?
   Geology was always my back up. After realizing marine biology wasn't my thing, I switched to geology. Career consideration was not important - I still don't know what I want to do.

2) Yes or no: Are you seriously considering pursuing a career in the geosciences? If "no", how (if at all) has your experience as a GG major influenced your career interest. If "yes", what type of career in geosciences most interests you?
   Yes - I still don't know what I want to do, but I believe structural geology interests me the most.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?
   I intend to apply for graduate school; however, I am taking a year off to decide what field to go into.

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. a) Not at all interested; b) Moderate-to-low interest; c) Moderate-to-high interest; d) Really, really interested. Please give a brief explanation for your choice.
   Moderate-to-high interest.
   After spending time working on projects and my undergrad thesis, I'm not quite sure research is for me. I have always wanted to teach kids in underdeveloped countries though.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.
   I think it is set up nicely. I like that a thesis would not be required and that you have the option of taking two years so that you can work and gain experience at the same time. However, I still think giving no help with tuition would discourage me.
Here are those with "c) Moderate-to-low interest" in apply to the MGeo program (question 4).

1) Why did you decide to become a GG major, & how important was career consideration in your decision?
   I have always been interested in hands-on work
   but the deciding factor was the fact that there was
   a high demand for geoscientists in the work field.
   
2) Yes or no: Are you seriously considering pursuing a career in the geosciences? If "no", how (if at all)
   has your experience as a GG major influenced your career interest. If "yes", what type of career in
   geosciences most interests you?
   "Yes", in physical volcanology, dealing with active
   volcanoes most likely.

3) Before reading the above information were you already seriously considering applying to graduate
   school for a M.S. or Ph.D. degree? If so, in what field?
   "Yes" but in a few years volcanology most likely.

4) After reading the above information, which one phrase below best describes your interest level in
   applying to the MGeo program. a) Not at all interested; b) Moderate-to-low interest; c) Moderate-to
   high interest; d) Really, really interested. Please give a brief explanation for your choice:
   Moderate-to-low just because I feel that I want to
   be more of a researcher. In a couple years
   however, that could change, and if it does, the
   program would be a very good option for me.

5) What recommendations might you have for making the MGeo degree more relevant to its intended
   purpose: serve students interested in geoscience related careers in industry but not research.
   From what I understand it looks to be quite relevant. The only classes I questioned is
   why it included in the program was GG 640
   could be relevant to some jobs but not all
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, and how important was career consideration in your decision?
   I chose GG because I was into math and science. It probably wouldn't have been better for me to go into engineering. Career considerations were pretty important but were not a huge factor in my decision.

2) Yes or no: Are you seriously considering pursuing a career in the geosciences? If "no", how (if at all) has your experience as a GG major influenced your career interest. If "yes", what type of career in geosciences most interests you?
   No, not really. I am looking more for something in education at the moment and possibly looking into getting a masters in something or another but I have not decided yet.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?
   Yes, I haven't found a field or subject that I would want to go into. It would most likely have to do with engineering, math, and physics and chemistry.

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. a) Not at all interested; b) Moderate-to-low interest; c) Moderate-to-high interest; d) Really, really interested. Please give a brief explanation for your choice:
   Moderate to low interest. I do not have much interest in taking more geology classes.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.
   I'm sure it is great for its purpose. It sounds good but it doesn't sound like something I am interested in.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, and how important was your career considerations in your decision?
   It was really interesting and I liked the fact that I could work with tangible processes. Ones that can be observed in nature/ all around us.

2) Are you seriously considering pursuing a career in the geosciences? (yes or no)
   Yes. I'd like to do something that allow me to be outside some of the time. But I don't have any concrete ideas of a direction yet.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?
   No

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.
   Moderate interest. It would be nice to get experience and better pay for after graduation, however the thought of spending another year in school isn't appealing.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.

   It sounds like a pretty good idea already. One year would be worth it for the chance of better pay on graduation.
1) Why did you decide to become a GG major, & how important was career consideration in your decision?

- [ ] Yes: Earth systems science/approach to solving problems
- [ ] No: The present *Learning the science was most important; career would come from the science

2) Yes or no: Are you seriously considering pursuing a career in the geosciences? If "no", how (if at all) has your experience as a GG major influenced your career interest. If "yes", what type of career in geosciences most interests you?

- [ ] Yes: Research-based career

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?

- [ ] Yes: *Geophysics

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. a) Not at all interested; b) Moderate-to-low interest; c) Moderate-to-high interest; d) Really, really interested. Please give a brief explanation for your choice:

- [ ] b) *Probably will not attend graduate school at UH; interested in a research-based career

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, & how important was career consideration in your decision?

   I decided to become a GG major after taking a 100-level intro class. I found it to be fun and challenging, which made me want to learn more about it. When I decided to become a GG major, I didn’t really think about career choices in the future. I mainly chose it because it was something that I enjoyed doing, and if I were to ever get paid for it, I would consider that to be a bonus!

2) Yes or no: Are you seriously considering pursuing a career in the geosciences? If “no”, how (if at all) has your experience as a GG major influenced your career interest. If “yes”, what type of career in geosciences most interests you?

   As of right now, I am undecided. The two fields of geology that interest me the most are mineralogy and petrology, but I feel as if my ultimate career goal is to teach. Pursuing a career in the geosciences would be great, but at this time I feel as if it is not a permanent career path for me.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?

   No, I did not originally plan to apply to graduate school for a M.S. or Ph.D. degree.

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program.

   b) Moderate-to-low interest. The phrase that would best describe my interest would be moderate-to-low interest. It seems to be more heavily based on engineering than the geosciences, so that could be somewhat discouraging to some people who may be interested in only the geosciences.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.

   Since “intermediate or high school education” is listed as a possible profession after completing the MGeo degree, I think it would be great if the required coursework included at least one or two educational classes that are specific to the teaching environment. If that was a requirement, then more people, who are interested in teaching geosciences, would potentially be more likely to apply for the degree.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, and how important was your career considerations in your decision?

I became a GG major because I wanted to do science but also wanted an opportunity to work outside.

2) Are you seriously considering pursuing a career in the geosciences? (yes or no)
   Yes.

2b) If "yes", what type of career in geosciences most interests you?
   Resource exploration interests me most, especially mineral resources. This is because you use a lot of the skills specific to geologists, i.e. field mapping, rock and mineral i.d., structural interpretation, stratigraphy, etc.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?
   Yes, applications for my M.S. are in. Applied in hydrogeology and structural geology.

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.
   Moderate to low interest. I would prefer a research based Master's. I think doing a research based Master's allows you to become more of a master of something whereas the MGeo degree gives you a survey. I think if people had their internship lined up prior to starting coursework they could take classes more applicable to what they are doing. They would also learn more from these classes.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose: serve students interested geoscience related careers in industry but not research.

   I think if students had an internship prior to beginning coursework they would have a better handle on the courses they want to take and would get more from the courses.
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, and how important was your career considerations in your decision?

I became a GG major to try to save the world. I tried environmental science first but it was all about farming. I probably should have stayed in environmental sciences. No, my career considerations was not in my decisions.

2) Are you seriously considering pursuing a career in the geosciences? (yes or no)

yes.

2b) If “yes”, what type of career in geosciences most interests you?

I would not mind going to do geology work in mines in Australia or just staying here and working for environmental companies collecting samples.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?

No, I was not.

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.

b) Moderate-to-low interest.

Right now I do not have interest or money in taking an extra year of college, however after reading this, I would keep this in mind in case later in my life I decide to come back to get my masters.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose:

serve students interested geoscience related careers in industry but not research.

N/A
Here are those “c) Not at all interested” in apply to the MGeo program (Q 4).

1) Why did you decide to become a GG major, and how important was your career considerations in your decision?

I became a GG major because of my love for space and volcanoes. I plan on working for NASA, hopefully as an astronaut, but I didn't want to do all the math and physics. So I picked geology.

2) Are you seriously considering pursuing a career in the geosciences? (yes or no)

Yes, I really really want to be an astronaut. I want to study lunar and maybe one day martian samples that I collected. I would also be ok with researching volcanoes around the world.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?

I have already applied to a few Ph.D programs around the world. Some are for degrees in planetary geology others are in volcanics.

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.

a) Not at all interested

It sounds like a really great program. However, my future goals are very researched focused. So this is not really a good program for me.
Proposal for a Professional Master of Geoscience (MGeo)

1) - became a GG major to learn about Earth systems science and to gain an understanding of an integrated approach to solving problems and looking at the natural world (integration of physics, chem, and math)

   - career would come from understanding of science...did not take science necessarily for a career

2) yes, researched based career

3) yes, geophysics/physics

4) choice a) no interest; want a research based career, probably will not attend graduate school at UH

5) no recommendations
Proposal for a Professional Master of Geoscience (MGeo)

1) Why did you decide to become a GG major, and how important was your career considerations in your decision?
   -I became a geology major because its what I find most interesting, but didn’t choose it for a specific career.

2) Are you seriously considering pursuing a career in the geosciences? (yes or no)
   -Yes, interested in a research career.

3) Before reading the above information were you already seriously considering applying to graduate school for a M.S. or Ph.D. degree? If so, in what field?
   -Yes, climate change and environmental sciences

4) After reading the above information, which one phrase below best describes your interest level in applying to the MGeo program. Please give a brief explanation for your choice.
   a) Not at all interested
      -Not interested in industry career.

5) What recommendations might you have for making the MGeo degree more relevant to its intended purpose:
   serve students interested geoscience related careers in industry but not research.
   -Maybe an undergrad intro class about those type of applied geosciences so people can figure out if thats something they would want to do. That way they could choose their BS electives to their accordingly, plan ahead in a way? Didn’t know if there was already a class like that.
Appendix 4. Executed ATP
MEMORANDUM

TO: Virginia S. Hinshaw
    Chancellor

FROM: Reed Dasenbrock
       Vice Chancellor
       for Academic Affairs

SUBJECT: Authorization to Plan, Masters in Geoscience, School of Ocean and Earth Science and Technology

I recommend that you approve the Authorization to Plan (ATP) for the Masters in Geoscience. The program will utilize existing courses and faculty workload and not require additional funding.

The ATP has been reviewed by the Dean and faculty, and the Council of Chief Academic Officers.

Attachment

c: Interim Associate Vice Chancellor Aune
    Program Officer Pearson
AUTHORIZATION TO PLAN (ATP) AN ACADEMIC PROGRAM

Please complete all sections with an emphasis on items 7, 8, 9 and 10. The ATP is not to exceed 5 pages.

1. School/College and Department/Unit
   School of Ocean and Earth Science and Technology, Department of Geology and Geophysics (GG)

2. Chair/Convener of Planning Committee
   Garrett Ito and Neil Frazer

3. Program Category: X New ___Modified ___ Interdisciplinary

4a. Degree or Certificate Proposed: Masters in Geoscience (M GEO)

4b. List similar degrees or certificates offered in UH System:
   Master of Science, Geology and Geophysics

5. Planning
   a. Planning period (not to exceed one year or reapplication is necessary)
      10/1/11 to 1/1/12
   b. Activities to be undertaken during the planning phase
      Consult with alumni, potential students, and local business to optimize degree requirements, course scheduling, and work-study activities. Develop a marketing plan. Write degree proposal.
   c. Submission date of program proposal
      January 2012
   d. Workload/budget implications during planning period
      Negligible additional work load anticipated by an ad hoc planning committee.

6. Program Description (Objectives and relationship to campus mission and strategic plan)
   The M GEO will be a professional masters degree program for students who seek careers in geoscience-related industries, but not necessarily academies. It is designed so that new freshmen at UH can complete a B.S. in Geology and Geophysics and the M GEO in five years. The M GEO program is also open to other students with BS degrees. The M GEO differs from the current M.S. degree in the Department of Geology and Geophysics (GG), which emphasizes basic research rather than application.

   The M GEO degree will bolster the University of Hawaii's mission of educating a skilled workforce in areas of growing importance to Hawai'i and the global economy. Such areas include the environment (e.g., environmental consulting, water resources, beach erosion, and climate change); natural hazards (mitigation and adaptation due to floods, tsunamis, earthquakes, landslides, volcanic eruptions), energy and natural resources (petroleum and gas exploration and development, alternative energy, metal and mineral resources), and education. It will directly support UH System goals related to "educational effectiveness" by expanding opportunities to a broader sector of student interests; and "learning, research, and service network" by enhancing workforce development through providing work study or internship programs with local companies. By also attracting K-12 educators to the program, GG aims to be among a growing number of geosciences departments nationwide...
taking larger roles in supporting K-12 education [Nyman and Ellmein, EOS, Trans. AGU, 89(50), 2008]. It is a part that GG can play in boosting the Hawai‘i state education system, which feeds students to the University and eventually to Hawai‘i’s workforce.

Relevant to the cost-revenue balance, students will not ordinarily be supported by Research Assistantships, tuition waivers, or individual office space. The program will leverage existing GG/SOEST resources as no new faculty are needed, one new, 1-credit course will be developed, and few additional offerings of existing classes will be required. Courses will need to be adapted, however, to accommodate the schedules of working professionals. These adjustments will include a combination of holding fewer but longer class meetings per week, offering courses during nights and/or weekends, as well as posting lecture material or videos of lectures online, and teaching courses live online.

7. Program Justification (Needs and Rationale. Include, as appropriate, internal and external factors driving need for this program; description of needs assessment; number of interested student per year; need for such a program in relation to workforce development, graduate studies, etc.)

There is a growing career path for students interested in science but who do not want to be academics [e.g., Teitelbaum and Cox, Nature 445, 2007]. Professional science masters degrees are being created by an increasing number of U.S. universities to meet this current demand (www.sciencemasters.com, see Supporting Documentation). The Professional Science Master’s (PSM) initiative currently recognizes 194 programs at 95 PSM-affiliated institutions, a nearly doubling of the number of affiliates since 2007. By opening our GG department to this sector of professional needs we can better serve both the state and the local geoscience community. Moreover, enlarging our enrollments at the graduate and upper-undergraduate level will benefit our current MS and PhD programs by allowing the GG faculty to teach some existing graduate courses more frequently and by providing the opportunity for our students to study alongside individuals with more diverse interests and professional expertise. Information about the PSM initiative as well as example programs affiliated with Geology and Geophysics at other universities is given in Supporting Documentation at the end of this document. Evidence for the need for this program is listed as follows:

• "The number of geologists working in environmental jobs has been growing steadily for over a decade, driven by increased government spending and environmental regulations. Legislatures rather than commodity prices drive the employment of these geologists. Employment in these areas has steadily increased because citizens and governments are now more concerned about issues such as pollution, land use and climate change. The ideals that drive the environmental movement are likely to continue and that will support geologist hiring and salaries." [www.geology.com].

• Over the next several years the number of geology job openings is expected to exceed the number of students graduating from university geology programs. Starting salaries for geologists have recently ranged from $50,000 to $100,000 per year [www.geology.com].

• WorldWideLearn (http://www.worldwidelearn.com) lists “Environmental Engineering” in the “Top Ten Jobs for the Next Decade and Beyond”. "In 2006, the Bureau of Labor Statistics reported on 54,000 environmental engineers in the field. But through 2016, this number is expected to increase by 25 percent, which makes it the fastest growing
engineering subcategory. And these predictions exist in the absence of global catastrophes. If the world’s oil supply plummets suddenly or if a series of natural disasters arrive simultaneously, demand for those with environmental engineering degrees could exceed even the current estimates. If that happens, then the current median salary of $70,000 a year might climb substantially. But even without dizzying demand and attractive salaries, many environmental engineers enjoy a level of fulfillment that other careers may not. Environmental engineers focus on urgent matters of security, safety, and health. Equally enticing, they spend much of their time outdoors in a variety of locations."

• "GeoSalaries Rise Almost 8 Percent" http://www.aapg.org/explorer/salariesurvey.cfm “As crude prices came out of the doldrums in 2010-11, so have the pay hikes for petroleum geologists. Over the past year, salaries for petroleum geologists for the year showed a weighted average increase of 7.9 percent, according to the annual AAPG Salary Survey. This compares with a 5 percent overall increase in 2009-10 and a 2 percent increase the previous year.”

• An informal market survey of our alumni and undergraduate body returned wide interest from individuals at various companies, government agencies, and schools in Hawai’i and other states. A few example responses include:

  “I would say 90% of all non-academic geology jobs here in Hawaii are in the environmental field, yet UH doesn’t prepare their graduates with courses for this field of work. It makes no sense to me. Maybe this masters program will allow geology grads to focus more in this area to prepare them for the job market in Hawaii.” – Dave Davis ESN Pacific, Honolulu, HI

  “As someone who pursued and received my MS in Geology & Geophysics there while working full-time as an Active Duty Army Officer, I say it sounds like a great plan! The late night research and hours in the labs killed me when I put on my uniform early every morning. If you need more than encouragement, let me know!” - LTC Joseph L. Ingagnoli, Commander, 7th Squadron, 6th Cavalry (ATK HEL), Conroe, TX

  “A Masters of Geoscience degree program would definitely draw interest from our firms staff. I can think of several people (4+) that would probably be interested in this program, including myself. Thanks for the opportunity to comment.” - Scott Moncrief, Project Manager, CH2M

  “The program sounds quite good- particularly in that the ‘culminating experience’ final project will be derived from the work place, tying together the practical and academic parts of the degree in a way that should benefit both the student and employer. I think if the program had been available at the time of my graduation I might have taken a job with a local firm and gone for it.” – Eden Jael Feirstein, Dept. Hydrology & Water Resources, University of Arizona

  “Currently, I work for the U.S. Geological Survey Water Resources Division in Honolulu. I have been an employee here since May 2005 under their Student Career Employment Program. The USGS and the university have a joining contract to employ me as a student until 2010. I would like to earn a professional degree with a focus on what I do here at the USGS, but do not know how to go about it or what the grand details are. ...” - Tracy Ibarra, USGS

  “...When I returned three years ago I was disappointed in knowing that my only chance to do a Masters in Geology was to quit my job and go through a traditional MS program I dismissed the idea
of going back to school.” "... I am a middle school teacher but would love to take courses to keep current in the field to be a better teacher.” Mahalo nui loa -Tina M. Mueller

8. Description of resources required
   a. Faculty (existing and new FTEs)
      Existing faculty will teach courses they are already teaching. Minimal additional FTE (approximately 0.25 FTE for year 1 and 0.1 FTE per year thereafter) are needed to develop online content, run and evaluate the program, as well as establish and maintain internships with companies and state agencies.
   b. Library resources (including an evaluation of current resources and an estimate of the cost of additional resources required)
      No additional resources needed.
   c. Physical resources (space, equipment, etc.)
      No additional physical resources needed
   d. Other resources required (staff, graduate assistantships, etc.)
      No additional staff or other resources needed

9. Five-Year Business Plan. Provide a five-year projected budget for the program that includes:
   a. Annual costs to implement the program (see table below)
   b. Projected enrollment and estimated tuition revenue (see table below)
   c. How will program be funded?
      Additional costs are negligible and will be absorbed by the school.
   d. Does the current or proposed budget (Department/College/Campus) include funds or a request for funds for the proposed program? Please provide details.
      (see table below)
   e. Given a “flat budget” situation, how will the proposed program be funded?
      Existing funds are nearly sufficient as additional costs are negligible. A flat budget would restrict the effort to revise course content or advertise the program.

<table>
<thead>
<tr>
<th>Standard Cost-Revenue Table Assuming All In-state Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>------</td>
</tr>
<tr>
<td>PROGRAM COSTS</td>
</tr>
<tr>
<td>Faculty w/o fringe</td>
</tr>
<tr>
<td>Other personnel costs w/o fringe</td>
</tr>
<tr>
<td>Library</td>
</tr>
<tr>
<td>Equipment/Supplies</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td><strong>TOTAL Expenses</strong></td>
</tr>
<tr>
<td><strong>REVENUES</strong></td>
</tr>
<tr>
<td>Projected Enrollment</td>
</tr>
<tr>
<td>No. of Courses</td>
</tr>
<tr>
<td>No. of Credits</td>
</tr>
<tr>
<td>SSH</td>
</tr>
<tr>
<td>Tuition Rate/Credit</td>
</tr>
<tr>
<td>Total Revenue from Tuition</td>
</tr>
<tr>
<td>Other Sources of Income</td>
</tr>
<tr>
<td><strong>TOTAL Revenues</strong></td>
</tr>
</tbody>
</table>
## Cost-Revenue Table Assuming 50% In-State, 50% Out-of State Tuition

<table>
<thead>
<tr>
<th>Year</th>
<th>FY2013</th>
<th>FY2014</th>
<th>FY2015</th>
<th>FY2016</th>
<th>FY2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Expenses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total FTE for all 30 credit hrs per year of program (0.2 FTE/cr.hr &amp; 1 FTE=$100K)</td>
<td>$600,000</td>
<td>$600,000</td>
<td>$600,000</td>
<td>$600,000</td>
<td>$600,000</td>
</tr>
<tr>
<td>FTE costs for ADDITIONAL course offerings needed for program (i.e., for a new 1-hr course)</td>
<td>$20,000</td>
<td>$20,000</td>
<td>$20,000</td>
<td>$20,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>Other personnel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplies (advertising, reproduction)</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Expenses for All 30 Credit hrs (includes current FTE without the M GEO)</td>
<td>$601,000</td>
<td>$601,000</td>
<td>$601,000</td>
<td>$601,000</td>
<td>$601,000</td>
</tr>
<tr>
<td><strong>Total ADDITIONAL Expenses</strong></td>
<td>$21,000</td>
<td>$21,000</td>
<td>$21,000</td>
<td>$21,000</td>
<td>$21,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>FY2013</th>
<th>FY2014</th>
<th>FY2015</th>
<th>FY2016</th>
<th>FY2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projected No. of Entering Students</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Projected No. of Full-Time Students</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Proj. No. Half-Time Students</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Projected Enrollment</td>
<td>4</td>
<td>8</td>
<td>11</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>No. of Credit Hrs Taught</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Student Semester Hrs (assuming full-time students take 30 cr/yr; half-time students take 15 cr/yr)</td>
<td>90</td>
<td>165</td>
<td>225</td>
<td>255</td>
<td>270</td>
</tr>
<tr>
<td>Tuition Rate/Credit (assuming 50% res. &amp; non. res)</td>
<td>$787</td>
<td>$787</td>
<td>$787</td>
<td>$787</td>
<td>$787</td>
</tr>
<tr>
<td>Total Revenue from Tuition</td>
<td>$70,830</td>
<td>$129,855</td>
<td>$177,075</td>
<td>$200,685</td>
<td>$212,490</td>
</tr>
<tr>
<td>Other Sources of Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td>$70,830</td>
<td>$129,855</td>
<td>$177,075</td>
<td>$200,685</td>
<td>$212,490</td>
</tr>
<tr>
<td>Revenue Minus Total Expenses</td>
<td>-$530,170</td>
<td>-$471,145</td>
<td>-$423,925</td>
<td>-$400,315</td>
<td>-$388,510</td>
</tr>
<tr>
<td>Revenue Minus Added Expenses</td>
<td>-$49,830</td>
<td>$108,855</td>
<td>$156,075</td>
<td>$179,685</td>
<td>$191,490</td>
</tr>
</tbody>
</table>

10. Impact on current courses or programs.
   Enlarging our enrollments at the graduate and upper-undergraduate level will benefit our current MS and PhD programs by allowing the GG faculty to teach some existing graduate courses more frequently and by providing the opportunity for our students to study along-side students with more diverse interests and professional expertise.

11. If this program is multidisciplinary, provide evidence of commitment for support from the colleges, departments, programs, and/or individuals expected to participate.
Reviewed by: (The ATP has completed the campus approval process prior to review by Council of Chief Academic Officers)

**Campus Chief Academic Officer:**
Comments and Recommendations:

<table>
<thead>
<tr>
<th>Reed Dasenbrock</th>
<th>12/13/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Name</td>
<td>Signature</td>
</tr>
</tbody>
</table>

**Council of Chief Academic Officers (Systemwide Consultation):**
Comments/Recommendations:

<table>
<thead>
<tr>
<th>Linda K. Johnsud</th>
<th>10/24/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Name</td>
<td>Signature</td>
</tr>
</tbody>
</table>

**Chancellor:** ✓ Approved   _ Disapproved

<table>
<thead>
<tr>
<th>Virginia S. Hinshaw</th>
<th>11/17/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Name</td>
<td>Signature</td>
</tr>
</tbody>
</table>

(Final signed copy is provided to the Vice President of Academic Planning and Policy for Program Action Report) 6/12/07
Supporting Documentation: Overview of the professional masters in geosciences (M GEO) degree

1. Target Market: Students who wish to gain an advanced degree in geoscience to benefit career pursuits fields such as:
- Environmental consulting, environmental engineering, environmental geology
- Engineering Geology, geotechnical engineering
- Hazards mitigation and adaptation
- Petroleum and gas exploration, including offshore exploration
- Economic geology, mining
- Alternative energy
- Intermediate or high school education

2. Features
- Five-year masters: entering freshmen can earn a B.S. in Geology and Geophysics as well as the M GEO degree in five years.
- Required minimum of 30 credit hours beyond what was taken for the BS. Up to 6 credits can be for the work-study requirement (Graduate Intern GG750). A minimum of 12 credits should be in courses numbered 600 and above, excluding GG750. Letter grades (A,B,C) must be taken in courses for at least 18 credits at the 300-level or above (excluding GG750 Graduate Intern). 1 credit per year must be in GG740 (M GEO Seminar)
- Students who complete the M GEO can apply to enter our PhD program without first completing an M.S.
- The M GEO degree differs from our M.S. (both Plan A and Plan B) by emphasizing coursework in applied science, and in providing practical work experience, rather than a research thesis (Plan A) or report (Plan B). The M GEO degree title will come with the equivalent prestige as the M.S. Plan A and more prestige than the M.S. Plan B.
- The program will be run by a GG faculty committee (the oversight committee) reporting to the chair and the department. To assure continuity, the chair of the oversight committee and its members will ordinarily be reappointed each year.
- Only one new 1-credit hr. GG course (GG740 MGeo Seminar) is needed (See Cost-Revenue Table above).
- Key courses will be taught on nights/weekends or include online content (e.g., lectures or recordings of lectures posted online) so they will be more available to working professionals.

3. Prerequisite: BS in natural science from an accredited university.

4. Undergraduate courses. Up to 18 credits will be taken from the following courses, provided they were not taken for the BS. Letter grades (A,B,C) must be taken in courses for at least 18 credits at the 300-level or above (excluding GG750 Graduate Intern).

<table>
<thead>
<tr>
<th>Course</th>
<th>credit hrs</th>
<th>Mean ranking of priority from 2001 employer survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geomatics (GG312)</td>
<td>3</td>
<td>3.33</td>
</tr>
<tr>
<td>Geological Data Analysis (GG413)</td>
<td>3</td>
<td>3.75</td>
</tr>
<tr>
<td>Geophysical Methods (GG450)</td>
<td>4</td>
<td>3.52</td>
</tr>
<tr>
<td>Environmental Geochemistry (GG425)</td>
<td>3</td>
<td>3.92</td>
</tr>
<tr>
<td>Hydrogeology (GG 455)</td>
<td>4</td>
<td>4.96</td>
</tr>
<tr>
<td>Engineering Geology (GG454)</td>
<td>3</td>
<td>4.32</td>
</tr>
</tbody>
</table>
Geological Remote Sensing (GG460) 4 3.36

Students who took all the above courses as undergrads may substitute extra graduate GG courses and/or the following two classes in Civil and Environmental Engineering:
Fluid Mechanics (CEE 320) 4
Geotechnical Engineering (CEE 355) 4

Writing requirement: At least 3 credits in a writing class are required in addition to those required to fulfill their B.S. degree. Eligible classes include any GG course designated as writing intensive (W) Technical Writing ENG308, Grant Writing for Graduate Students TPSS657

Substitutions other than the above will require the approval of the oversight committee.

5. Graduate courses
A minimum of 12 credits will be taken from graduate courses numbered 600 and above, excluding GG750 (Graduate Intern). For example, students who take less than 18 credits from the undergraduate courses listed in (3) will need correspondingly more graduate courses to make their total of 30 credits. 1 credit per year must be in GG740 (M GEO Seminar)

6. Culminating Experience
Students are required to do a work-related project either as an intern, volunteer, or employee of a local company or agency. The culminating experience will involve a written report or technical paper as well as oral presentation on their work. The oral presentation can be made at UH or at the location of the sponsoring organization.
### 6. Sample Schedule for 5-year B.S. and MGEO

<table>
<thead>
<tr>
<th>Year &amp; Fall Courses</th>
<th>Credits</th>
<th>Nil Credits</th>
<th>Year &amp; Spring Courses</th>
<th>Credits</th>
<th>Nil Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG 170 (DP+DY)</td>
<td>4</td>
<td>0</td>
<td>GG200</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140 (FS)</td>
<td>3</td>
<td>0</td>
<td>MATH 241</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>ENG 100 (FW)</td>
<td>3</td>
<td>0</td>
<td>FR 102</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>HIST 151 (FG/A)</td>
<td>3</td>
<td>0</td>
<td>CHEM 161</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>FR 101</td>
<td>3</td>
<td>0</td>
<td>CHEM 161L</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total: 16</strong></td>
<td></td>
<td></td>
<td><strong>Total: 15</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year &amp; Fall Courses</th>
<th>Credits</th>
<th>Nil Credits</th>
<th>Year &amp; Spring Courses</th>
<th>Credits</th>
<th>Nil Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 242</td>
<td>4</td>
<td>4</td>
<td>PHYS 170+L</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>GG301</td>
<td>4</td>
<td>4</td>
<td>GG302 (WI)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 162</td>
<td>3</td>
<td>0</td>
<td>WS 200 (DS)</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>CHEM 162L</td>
<td>1</td>
<td>0</td>
<td>AMST 201 (DH)</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>MUS 107 (FG/C)</td>
<td>3</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total: 16</strong></td>
<td></td>
<td></td>
<td><strong>Total: 14</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year &amp; Fall Courses</th>
<th>Credits</th>
<th>Nil Credits</th>
<th>Year &amp; Spring Courses</th>
<th>Credits</th>
<th>Nil Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 272+L</td>
<td>4</td>
<td>4</td>
<td>GG304</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>GG325</td>
<td>3</td>
<td>3</td>
<td>GG Elective</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>THEA 101 (DA)</td>
<td>3</td>
<td>0</td>
<td>Elective (WI)</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>GG250</td>
<td>3</td>
<td>3</td>
<td>GG309</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>SOC 100 (DS+WI)</td>
<td>3</td>
<td>0</td>
<td>GG410 (O)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total: 16</strong></td>
<td></td>
<td></td>
<td><strong>Total: 16</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year &amp; Fall Courses</th>
<th>Credits</th>
<th>Nil Credits</th>
<th>Year &amp; Spring Courses</th>
<th>Credits</th>
<th>Nil Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG303</td>
<td>3</td>
<td>3</td>
<td>GG305 (WI)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>GG Elective</td>
<td>3</td>
<td>3</td>
<td>GG Elective</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>GG Elective (WI)</td>
<td>3</td>
<td>3</td>
<td>NI Elective (E)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>0</td>
<td>MICRO 130 (DB)</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>HWST 107 (H)</td>
<td>3</td>
<td>0</td>
<td>Elective</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>KSL 102</td>
<td>1</td>
<td>0</td>
<td>KLS 152</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total: 16</strong></td>
<td></td>
<td></td>
<td><strong>Total: 16</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year &amp; Fall Courses</th>
<th>Credits</th>
<th>Nil Credits</th>
<th>Year &amp; Spring Courses</th>
<th>Credits</th>
<th>Nil Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG600</td>
<td>3</td>
<td>3</td>
<td>GG652</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>GG413</td>
<td>3</td>
<td>3</td>
<td>GG685</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>GG425</td>
<td>3</td>
<td>3</td>
<td>GG455</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>ENG308</td>
<td>3</td>
<td>3</td>
<td>GG750 (Graduate Intern)</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>GG750 (Graduate Intern)</td>
<td>2</td>
<td>2</td>
<td>GG740 (MGeo Seminar)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total: 14</strong></td>
<td></td>
<td></td>
<td><strong>Total: 16</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sample Schedule for 2-year MCEO Taken Part Time

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Fall</th>
<th>Credits</th>
<th>All Credits</th>
<th>Year 2 Winter</th>
<th>Credits</th>
<th>All Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG740 (MGeo Seminar)</td>
<td>1</td>
<td>1</td>
<td></td>
<td>GG450</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>ENG308</td>
<td>3</td>
<td>3</td>
<td></td>
<td>GG750 (Graduate Intern)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Total:</td>
<td>4</td>
<td>4</td>
<td></td>
<td>Total</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Fall</th>
<th>Credits</th>
<th>All Credits</th>
<th>Year 1 Spring</th>
<th>Credits</th>
<th>All Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG600</td>
<td>3</td>
<td>3</td>
<td></td>
<td>GG740 (MGeo Seminar)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>GG655</td>
<td>3</td>
<td>3</td>
<td></td>
<td>GG685</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>GG750 (Graduate Intern)</td>
<td>3</td>
<td>3</td>
<td></td>
<td>GG750 (Graduate Intern)</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Total:</td>
<td>9</td>
<td>9</td>
<td></td>
<td>Total</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

The following course instructors have expressed interest in rescheduling class times and developing online materials/lectures to make their existing courses accessible to working professionals: Robert Dunn, Aly El Kadi, Garrett Ito, Steve Martel, Greg Ravizza, Scott Roland, Ken Rubin, Paul Wessel.
A Master's for Science Professionals Sweeps U.S. Schools

In JOSEPH KONRAD
Published December 30, 2010

BOSTON — A curiosity tucked away in a handful of university catalogs a decade ago, the professional science master's degree is emerging from the shadows at a number of college campuses.

The degree, which a few universities quietly pioneered in the mid-1990s, combines graduate studies in science or mathematics and business management courses. In 2008, 58 universities were offering the professional science master's degree, or P.S.M., according to the Council of Graduate Schools in Washington. By the start of this academic year, the number had nearly doubled to 103, and is set to climb further.

The number is certain to grow because the professional science master's degree is being adopted by at least six state university systems. In addition, in February, the first P.S.M. program in Europe was created at the Open University in Milton Keynes, northwest of London.

Advocates of the degree say it will become a fixture at many more universities because it promises to satisfy the work force requirements of increasingly technological economies in the United States and abroad.

"I think it as a 21st-century degree," said David King, dean of graduate studies and research at the State University of New York in Oswego. "It's interdisciplinary. It's a hybrid, which I think is more agile. It's responsive to rapidly changing needs in terms of the job market."

Mr. King likens the growth of the P.S.M. to the emergence of the M.B.A. more than a century ago. He heads a systemwide consortium of 16 New York colleges and universities that introduced the P.S.M. on seven campuses in September. (The degree was already being offered at an eighth campus in the consortium, the University of Buffalo.) He said he expected all 16 schools to offer the degree next year.

The professional science master's degree received an important impetus two years ago from a committee of the National Research Council, which urged into ways to enhance the master's degree in the natural sciences.

Carol Lynch, director of the professional science master's program of the Council of Graduate Schools, estimates total P.S.M. enrollment around 5,000. That is a tiny fraction of the hundreds of thousands enrolled worldwide in M.B.A. programs, but Ms.

Lynch said the degree is "on a huge trajectory, and we're just getting started."

Already, however, the subject matter of professional science master's curriculums differs widely (as does tuition, which ranges from a few thousand dollars a year to more than $20,000). Studies in biotechnology and environmental science are in particular demand. Also required are business courses in subjects like project management and communications.

The degree typically involves two years of study, and there is no thesis requirement. But P.S.M. students must work with a "real world" company either in an internship or on a project.

Most enrolled students are Americans, many at large state schools, according to the Council of Graduate Schools.

But there is a large minority of international students pursuing a P.S.M. One of them, Asunah Pandey, 23, is studying biotechnology at Northeastern University in Boston. After earning an undergraduate degree in that subject last year at the Amity Institute of Biotechnology in New Delhi, he found that his options were limited to embarking on a doctorate program with a researcher's career in mind or working as a low-paid laboratory assistant for an Indian biotech company.

"I didn't want to do a research-oriented course," Mr. Pandey said. "I was more interested in industry." He thought that with a P.S.M. degree in biotechnology, he could stick to a field he liked and prepare for a management-level job. When he completes his degree, he will look for a job with a U.S. biotech company, aiming to save enough money in two to three years to repay his parents the $35,000 that they lent him to cover his tuition.

Northeastern's biology-oriented P.S.M. classes have attracted international students, particularly from India. Of the 154 students who enrolled this autumn, 76 are from countries other than the United States, with 68 from India.

Northeastern has been increasing its P.S.M. offerings, having inaugurated a course in bioinformatics in 2001 and adding specialties in biotechnology, marine biology and regulatory science.

Murray Gibson, dean of Northeastern's College of Sciences, said the professional science master's degree provides a "potential source of revenue," deepens the school's partnerships with business and links its professors and students to cutting-edge business research. "It goes two directions. We can service industry and know better what's going on outside the university," he said.
A Master’s for Science Professionals Sweeps U.S. Schools
Published December 26, 2010

Among the companies that employ P.S.M. graduates of Northeastern is Regeneron Pharmaceuticals, a biotechnology company based in Tarrytown, New York. Several degree holders are working at Regeneron in program management or regulatory affairs, said Ross Grossman, the company’s vice president for human resources. The value of the degree, he said, “is it enables you to put people in business roles who really understand science, which is critical to what we do.”

Notably heeding such business demand is the University of Maryland’s University College, where instruction in biotechnology, biodefense and other P.S.M. programs is entirely online. Enrollment — mostly of midcareer, part-time students — is up from 1,365 two years ago to 1,967 now, according to a university representative.

The trend has been fueled since 1997 by a total of $22 million in grants to dozens of universities from the Alfred P. Sloan Foundation. And, starting in 2009, the National Science Foundation injected $15 million in grants to help create the degree on U.S. campuses.

Also propelling the P.S.M. movement is the statewide introduction of programs by public university systems, under way in Arizona, California, Oregon, North Carolina, Florida and New York.

Policy makers in the six states are investing in P.S.M. expansion as the kind of work-force-development catalyst that they see as key to economic revival.

But some of the nation’s most prestigious universities have not embraced the idea: None of the Ivy League schools have, though the program is on the drawing board at Cornell University, which is a member of Mr. King’s statewide consortium in New York.

Some faculty members at top universities that focus heavily on research are resisting. “Why should you bother me by introducing a new master’s degree when I’m already busy with what I’m doing with the Ph.D.’s,” they ask, according to Ms. Lynch, of the Council of Graduate Schools.

Nor has the idea caught on outside the United States, except at the Open University in Britain, the University of Queensland in Australia and the University of British Columbia in Canada.

Queensland, which has 100 students enrolled in its P.S.M. in biotechnology, caters mostly to international midcareer students from India, the Middle East and China on its Brisbane campus. “The cream of the crop go on to higher degrees or jobs in local industry,” said Ross Barnard, Queensland’s P.S.M. director.
The Professional Science Master's (PSM) is an innovative, new graduate degree designed to allow students to pursue advanced training in science or mathematics, while simultaneously developing workplace skills highly valued by employers. PSM programs consist of two years of academic training in an emerging or interdisciplinary area, along with a professional component that may include internships and "cross-training" in workplace skills, such as business, communications, and regulatory affairs. All have been developed in concert with employers and are designed to dovetail into present and future professional career opportunities.

**PSM Overview**

The Professional Science Master's (PSM) degree is an innovative two-year graduate degree designed to allow students to pursue advanced training and excel in science while simultaneously developing highly-valued business skills. PSM programs prepare students for science careers in business, government, or nonprofit organizations, where workforce needs are increasing. Programs are characterized by "science-plus," combining rigorous study in science or mathematics with skills-based coursework in management, policy, or law. PSM programs emphasize writing and communication skills, and most require a final project or team experience, as well as a "real-world" internship in a business or public sector enterprise.

The PSM programs now recruiting are of three kinds:

- Those that deepen a student's knowledge beyond what can be learned in a four-year course of study, but stay within a disciplinary domain;
- Those that fuse scientific fields at a level of depth and complexity hard for undergraduates to achieve; in many cases, the fusion may be with computer or information sciences; and
- Those that integrate study in the natural sciences and mathematics with knowledge and training in management, law, or other professional domains.

Programs are developed in concert with industry and are designed to dovetail into present and future professional career opportunities. Graduates are equipped to manage the breakthroughs that are created by the research teams. They can interact between researchers and managers, especially in the marketing, finance, and legal departments.

The PSM began in 1997 with a series of grants from the Alfred P. Sloan Foundation to selected research universities. (Background on the PSM initiative.)
State University of New York, University at Buffalo

GRADUATE PROGRAMS

DIRECTOR OF GRADUATE STUDIES
Dr. Charles F. Mitchell
office: 771 Natural Sciences Complex
phone: (716) 645-4290
email: cmitch@buffalo.edu
website: Dr. Charles Mitchell's webpage

GRADUATE SECRETARY
Ms. Marty Roth
office: 411 Cooke Hall
phone: (716) 645-3489
email: mroth@buffalo.edu

INTRODUCTION

The Department of Geology at UB offers a comprehensive graduate program designed for those with either academic or professional aspirations. We present a robust sequence of courses specifically designed to play on the strengths of our department, and to ensure that graduate students leave here with an integrated understanding of geology. The combination of this curriculum and our faculty of internationally renowned researchers make ours an outstanding graduate program.

DEGREES

The Department of Geology offers traditional M.A. (non-thesis), M.S. and Ph.D. degrees. Students interested in paleontology also may participate in the interdisciplinary graduate programs in Ecology, Evolution and Behavior. In addition, we are a participating department in two NSF-sponsored IGERT programs for PhD students at UB: ERIE is for students who's dissertation research emphasizes an element of ecosystem restoration and the GI Science program is for students who will integrate geospatial information into their dissertation research.

CERTIFICATES

The Department of Geology offers an advanced, graduate certificate program in Professional Science Management. The Professional Science Management (PSM) certificate is designed to allow students to pursue advanced training in science without a Ph.D., while simultaneously developing highly-valued business skills without an MBA. The PSM is best suited for students who seek science careers in business, government or non-profit organizations.
PROFESSIONAL SCIENCE MANAGEMENT CERTIFICATE PROGRAM

The Department of Geology offers an advanced, graduate certificate program in Professional Science Management. The Professional Science Management certificate is designed to allow students to pursue advanced training in business, government or non-profit organizations without a Ph.D., while simultaneously developing highly-valued business skills.

The PSM is best suited for students who seek science or technical expertise in business, government or non-profit organizations.

The Certificate program is open to candidates for the Master’s degree in Natural Science Interdisciplinary, Geography, Geology, Chemistry, Biology, or those already holding an appropriate baccalaureate degree in the sciences. U.S. and international students are eligible to participate in the Certificate program.

Admission

Students enter the program by applying to and being accepted in a ‘home department’ – a department in which they will pursue disciplinary coursework and a related internship or laboratory experience. Students may pursue the Certificate through the Departments of Biological Sciences, Chemistry, Geology, or Geography.

Students must apply online through the University’s Interactive Graduate Application Site: http://www.grad.buffalo.edu/admissions/applications.php. There is no application fee to apply to the certificate program if you are a current graduate level student at the University at Buffalo, or if you’ve applied to a graduate program at the University at Buffalo. Applications are accepted on a rolling basis, but you’re encouraged to apply early.

Coursework

The PSM program requires the completion of five courses. The professional courses are in management skills evaluation (MGG 501 or MGB 666) and a graduate research ethics (PHI 640). The geology courses are Analysis of Geological Data (GLY 529), GIS for Earth and Environmental Scientists (GLY 560) and 3 Credit hours of Graduate Research (GLY 633).

Substitution of courses completed at other institutions or within other departments will be allowed at the discretion of the Department of Geology, Director of Graduate Studies.

All students will be required to develop a portfolio of their work; including presentations from the internship/project/lab experience. Exit interviews are mandatory upon program completion and should be scheduled with the PSM Office during your last semester of classes.

Academic Grade Requirements:
A graduate student must maintain a B (3.0) average in graduate courses. A grade of C must be received in all graduate courses taken outside of Geology.
Rice University:

Professional Science Master's
-Wiace School of Natural Sciences - Rice University

An Unconventional Degree

PSM Enrollment

Enrollment Summary 2002 - 2010

<table>
<thead>
<tr>
<th>TRACK</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>TOTAL</th>
<th>GRADUATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Analysis</td>
<td>2</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>37</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Geology</td>
<td>n/a</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>9</td>
<td>9</td>
<td>34</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Geophysics</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>25</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Geosciences 3000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enrollment Total</td>
<td>3</td>
<td>10</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>12</td>
<td>14</td>
<td>17</td>
<td>18</td>
<td>56</td>
<td>50</td>
</tr>
</tbody>
</table>

Subsurface Geoscience Program, Earth Science Department
Rice PSM Program = 100% Placement
Supporting Documentation: Informal market survey regarding the proposed MGeo program

The memo sent to the alumni for whom we have email addresses:

To: Alumni and Friends in Hawaii’s Geoscience Industry
From: Neil Frazer, neil@soest.hawaii.edu
Regarding: Proposed MGeo degree

I’m writing to ask whether anyone in your company is a potential student for a new, professional masters degree program we are trying to establish in the Department of Geology and Geophysics at UH Manoa.

Geology undergraduates could earn this degree with an additional year of study past the B.S. However, we think our largest group of potential customers is working scientists and professional engineers who want to earn a graduate degree in earth sciences without becoming a research scientist. We expect that many, if not most, of these students will be part-time students with full-time jobs.

The new degree will have the name Master of Geoscience (abbreviated as MGeo.) in order to distinguish it from our existing MS degree, which is mostly concerned with research. The name was chosen for its similarity to the MEng. offered by many engineering departments, which is widely recognized as a professional degree.

The program will consist of 12 credits from upper level GG courses not already taken as an undergraduate, and 12 credits from non-seminar GG graduate courses numbered 600 or above. Students who enter with a BS in geology can substitute extra GG graduate courses or upper level courses in departments such as Civil and Environmental Engineering, depending on their needs. University requirements for any Masters degree require a “culminating experience” which, for this degree, will be an oral presentation of a 6-credit geoscience project carried out in connection with their employment.

Each candidate for the MGeo. will be assigned a faculty advisor and co-advisor to help him design a program that meets his professional needs.

Please let me know, frankly, whether this program is of interest to anyone in your company, and what, if anything, we could do to make it better. A few words by email would be most welcome. Thanks for your help.

The memo emailed to GG undergraduates:

To: GG Undergraduates
From: Neil Frazer, neil@soest.hawaii.edu
Regarding: Proposed MGeo degree

I’m writing to ask whether you would be interested in the new, professional masters degree program we are trying to establish in the Department of Geology and Geophysics at UH Manoa.

Geology undergrads could earn this degree with an additional year of full-time study past the B.S. However, we expect that many of the students in the program will be part-time students with full-time jobs.
The new degree will have the name Master of Geoscience (abbreviated as M.Geo.) in order to distinguish it from our existing MS degree, which is mostly concerned with research. The name was chosen for its similarity to the M.Eng. offered by many engineering departments, which is widely recognized as a professional degree.

The program will consist of 12 credits from upper level GG courses not already taken as an undergraduate, and 12 credits from non-seminar GG graduate courses numbered 600 or above. Students who enter with a BS in geology can substitute extra GG graduate courses or upper level courses in departments such as Civil and Environmental Engineering, depending on their needs. University requirements for any Masters degree require a “culminating experience” which, for this degree, will be an oral presentation of a 6-credit geoscience project carried out in connection with their employment.

Each candidate for the M.Geo. will be assigned a faculty advisor and co-advisor to help him design a program that meets his professional needs.

If you have any thoughts or questions about the proposed new degree, I’d appreciate an email.

Here are the responses:

Nice job! I think the hydrographic and marine surveying industries may be good targets for this - assuming we could teach the sorts of classes they want. Also NAVOCEANO and other Navy groups, and perhaps our NOAA colleagues doing work in the Coral Reef Ecosystem Division and the Marine Sanctuaries program.

Bruce Appelgate, PhD
Director, Ocean Technology Group (OTG)
University of Hawai‘i School of Ocean & Earth Science & Technology
1680 East-West Road, Honolulu HI 96822
tel: 808-956-9720   web: http://www.soest.hawaii.edu/HMRG

The program looks good. One suggestion I have is to require a technical writing class and not just an oral presentation, but a written report or final project paper. We constantly have problems with scientists and engineers coming out of the various universities and not being able to write. Since the final product that we give our clients is a written report, it is of utmost importance that our employees are competent writers.
Thanks for the opportunity to look at the program, Jenni

Jennifer Kleveno Hernando
Mountain Edge Environmental, Inc.
62-180 Emerson Road
Haleiwa, Hawaii 96712
Phone: (808) 637-1200
Fax: (808) 637-0001

Thank you for sending out the letter regarding the professional masters degree. I would definitely be interested in learning more about this program. I have a BS in Geo./Geophys. from U.H. Manoa and have been working for the USGS Water Science Center since 2000. It has always been my plan to continue my studies at some point. However, as you know it is hard to find the time once in career type work positions. Please keep me on the emailing list.

Marcael (Ball) Jamison (U.H. Alumni 1997)
Hydrologic technician
U. S. Geological Survey, Pacific Islands Water Science Center
677 Ala Moana Blvd. Suite 415
Honolulu, HI. 96813
(808)587-2431
mjamison@usgs.gov

This sounds really exciting. I wish this was around when I was thinking
about a Masters. I would have seriously considered this program because it doesn’t tie you down
so much to research, but would broaden horizons in the geophysical world, which is why I am
here in the first place.

Melody Studer
808-956-5241 (office)
808-956-5154 (fax)
SOEST, Geology and Geophysics, POST 842B
1680 East-West Rd., Univ. of Hawaii
Honolulu, Hawaii 96822 USA
mstuder@hawaii.edu

A Masters of Geoscience degree program would definitely draw interest
from our firms staff. I can think of several people (4+) that would
probably be interested in this program, including myself. Thanks for the opportunity to comment.

Scott Moncrief
Project Manager, CH2M
Scott.Moncrief@ch2m.com

I love the idea and would love to take courses to work towards a M. Geo degree. While I was
living in CA and working at a geo-technical/engineering firm there were some many options for
professional development. When I returned three years ago I was disappointed in knowing that
my only chance to do a Masters in Geology was to quit my job and go through a traditional MS
program I dismissed the idea of going back to school. I am not part of your target group as I am a
middle school teacher but would love to take courses to keep current in the field too be a better
teacher.

Mahalo nui loa,
Tina M. Mueller
tinamahina@mac.com

Hey, that degree sounds like a great idea, I personally would love to get involved in a program
like that. The M.Geo. degree would hold the same merit as the regular MS degree right? Please
let me know when you are starting this and the entrance requirements.

Thanks, and I hope the program makes it, one more year for a Masters would be great.

Michael Smith
Mikhael Smith Consulting
mdsmith@hawaii.edu

Thank you for including alumni such as myself in your investigation into the viability of a
M.Geo. program. Before I proceed with my comments, I should state up front that I am not
working in industry, but neither am I a (strictly-speaking) a researcher, though I hold a Ph.D.
degree (I’m employed by the Pacific Tsunami Warning Center). That being said, I do know
people who work in industry (esp. environmental) who would be among your targeted M.Geo.
candidates, and feel I have some insight into what they might feel about what this program would
offer.

You specifically state that your best candidates for the M.Geo. program would be people already
working in industry who hold a bachelor’s degree. I’m not sure that would be true. You are
proposing a one-year program (24 credits including the oral presentation, if I understand this correctly), but if the student is attending part-time, this degree will take considerably longer, possibly reducing its appeal. Furthermore, you suggest that the student's project would be work-related, yet under the supervision of a pair of G&G faculty members. A seasoned employee in a given field is likely to feel that they and their supervisor(s) are the experts of their current line of work, and since (please correct me if I'm wrong!) G&G doesn't have many faculty members with recent industry experience, such a potential student may need some convincing that a member of the G&G faculty knows more about their job than they do. Possible exceptions to this would be someone who's still pretty green (e.g., less than a year's experience), someone looking to change jobs (in which case, they need a project at their new job), or someone needing the credentials for a promotion or to start a consultancy.

I do think, however, that the M.Geo. program will appeal to current undergraduate students who would be willing to attend school an extra year in exchange for a higher degree and industry experience. This would be especially true if the M.Geo. program could be manifested as some sort of internship program with local companies (also common in engineering programs). This would not only appeal to students already enrolled, but expand the appeal of the undergraduate program in general. An incoming or current student would know that they had the option to gain industry experience and the chance to get their "foot in the door" with industry upon graduation with the higher degree. Furthermore, it would help the department gain some outreach to local industries, and if some kind of internship program is developed, then even long-term professional relationships could be forged between faculty members and industry specialists (thus eventually removing one of my suggested obstacles in the previous paragraph). And just as side note—in the past the G&G department tried to enhance its enrollment by allowing undergraduates to specialize early in the program, which resulted in graduating students with specializations but also with deficiencies. The M.Geo. would appeal to these same students, give them the specialization they need, but without sacrificing other areas of a "classic" geoscience undergraduate curriculum.

So, in short, I think the M.Geo. program is a fine idea. I just think that you'll have better luck finding your M.Geo. candidates from within the G&G program than without. Thank you for your time,

Nathan Becker
nbecker@hawaii.rr.com

As someone who pursued and received my MS in Geology & Geophysics there while working full-time as an Active Duty Army Officer, I say it sounds like a great plan! The late night research and hours in the labs killed me when I put on my uniform early every morning. If you need more than encouragement, let me know!

LTC Joseph L. Ingignoli
Commander
7th Squadron, 6th Cavalry (ATK HEL)
4724 South Parkway
Conroe, Texas 77303-4355
(936) 525-3385
joseph.ingignoli@us.army.mil

I think that this is a great idea and am definitely interested in the program. I would hope that you will have enough response to make this a reality. I graduated in 1987 with a BS geology and geophysics degree, but have not had time to go back and get the masters due to steady work as a consultant.
Working in the consulting realm actually presents some projects that would make a good "culminating experience". I am especially interested in groundwater flow within the caprock for instance, and have several projects that would make for interesting study.

Please include me on the mailing list for any further updates on the program.

Marc Dexter, PG, REM  
Project Manager  
CH2M HILL, Honolulu Office  
1585 Kapiolani Boulevard Suite 1420  
Honolulu, Hawaii 96814  
(808) 440-0248 phone  
(808) 945-7248 fax  
(808) 864-3591 cellular  
marc.dexter@ch2m.com

I like the sound of this new professional degree. I have a few questions,

1st: When would the program start?  
2nd: Will this program use the same entrance requirements as a master's degree? (i.e. GRE scores)  
3rd: Will the program require the student to be already employed, or is there a group of companies that are willing to work with the program that the department had in mind?

I am personally very interested in this degree. On a more collective level, I believe that this professional degree is a wonderful idea. It will strengthen the bridge between academia and industry which seems to be missing currently in GG. Also, I will talk to a couple of my undergraduate colleagues that I know are interested in going more the direction of industry after they graduate their thoughts on this degree.

Benjamin R. Sellers  
Undergraduate/Research Assistant  
Department of Geology and Geophysics:  
Volcanology Division  
S.O.E.S.T.  
bsellers@hawaii.edu

Thanks very much for the information. You are correct in your conclusion that a significant proportion of GG alumni have taken the industry route rather than academic route. For those of us that chose the former, the transition to the environmental industry was quite challenging. This proposed focused degree would be good for all involved: it would make the transition easier for the future graduates, it would provide those of us already in the industry with new hires that are more prepared for the different demands, and it would hopefully attract a larger pool of students to GG or SOEST.

My own experience with hiring alumni from the various branches of UH geosciences has mostly been good so far, but like anything else, can get better. My own specific suggestions deal with largely non-technical topics, as the graduates in general have had a good grounding in the sciences. The following are my specific suggestions:
1) Training in business aspects like project management or cost accounting. I would agree very much with those that would conclude that these topics are not technical and that they would very likely not be of great interest (if at all) to most students going into the geosciences. On the other hand, my own experience is that these represent a significant proportion of work in an industry setting. I will go even farther to say that while such skills may not be immediately essential to an entry level candidate, very few will be able to advance very far in industry without them. While Civil Engineering has some aspects of this built-in to their technical curriculum, there was nothing equivalent in the geosciences when I was in the program (admittedly, this was sometime in the early Bronze Age). Our experience with recent graduates suggests that this has not changed.

2) Most industry work absolutely requires a firm knowledge of focused regulations and/or laws. By example, I am convinced that our own field of environmental remediation would not exist if environmental laws did not exist, as well. As with business/management training, this was nowhere part of the GG curriculum in the past and I am not aware if this has changed recently.

3) The third point deals with a more general aspect that I am sure you have already experienced. Have students take more classes that are writing-specific or -intensive to develop their skills of expression. There has been a rather startlingly wide range in the demonstrable writing skills of recent graduates.

Thanks for the chance to give input and I would be very interested to see where this goes. I hope things are well with you.

By the way- if the response to your message is a little light overall, it may be that some recipients will have the message flagged as "spam" by their operating systems and delete them without knowing. As you can see, that was the case with me, and I almost deleted the email until I recognized your name.

Bruce Tsutsui
Environmental Science International
56 Oneawa Street Suite 103
Kailua, HI 96734
Phone: (808) 261-0740
Fax: (808) 261-0749
Cell: (808) 864-4563
Email: btutsui@esciencei.com

I'm finishing my Masters in Geological Engineering from the University of Nevada, Reno. This new masters of geoscience sounds very interesting and exciting. Here are my concerns:
-What are Hawaii's requirements for a engineer intern license? In Nevada and Illinois (where I currently live), in order to take the licensure exam, you must have a degree in engineering from an ABET certified school. I know the Engineering School at UH is ABET certified but SOEST is not. This changes the minimum requirements (i.e., years of graduate school and/or years of experience) needed to take the exam and to eventually become certified as a Professional Engineer.
-What are Hawaii's requirements to become a state certified geologist? In Illinois, you must work
with a state certified geologist for x-many years before qualifying to take the exam.

-How many engineering firms in Hawaii employ staff geologists? I think they are getting away with only geotechnical (civil) engineers

-I am currently on track for a research scientist position but I worked as a junior engineer in Reno and now as an assistant to a fluvial geomorphologist. My employers are puzzled that I did not take a groundwater hydrology course (a requirement course for the masters in geoscientific engineering). Although a masters degree on your resume looks great, marketing skills (programming, familiarity with computer software) are a plus (as well as experience).

-How many UH undergraduates go on for a graduate degree? How many in the field of geosciences? Mike Dahilig was in my graduating class and he's graduating with a law degree.  

More effort needs to be made to get undergraduates interested in research and/or exposed to graduate school opportunities. Not much effort was made to retain graduating undergrads as UH graduate students. I wasn't sure exactly what I wanted to pursue until my senior year, when it was too late to start a senior thesis project.

Again, just some thoughts. Please feel free to contact me if you have any more questions.

Kimberly "Kimi" S. Artita
Assistant
Little River Research & Design
www.emriver.com
618-203-1837

Thanks for passing this information on to me. I will spread it around to my people and my clients I come in contact with. It seems like a good deal to me. I have been in full support of UH offering more classes and degrees for people wanting non-research jobs. I would say 90% of all non-academic geology jobs here in Hawaii are in the environmental field, yet UH doesn't prepare their graduates with courses for this field of work. It makes no sense to me. Maybe this masters program will allow geology grads to focus more in this area to prepare them for the job market in Hawaii. I will let you know if I talk to anyone interested.

Dave Davis
ESN Pacific
1818 Kahai St. Honolulu, HI 96819
T 808-847-0067
F 808-847-0917
email: esn@esnpacific.com

Hello. I just got this e-mail from one of our recently matriculated former undergraduates. Note the line in bold.

I just wanted to thank you for your recent help with my pursuit of the State geologist position. I found out that the position is under the DLNRs commission on water resource management. Apparently the State does employ geologists under different departments such as DOH, DLNR, and the Planning branch. Unfortunately I found out that I do not have the requirements to pass the dept. of human resource's screening process (min. 3 yrs exp.). However, I did have a meeting with the DLNR folks and they offered me a position as a hydrologist. The idea is that I can gain the required amount of experience in the hydrologist position and then eventually transfer to a geologist position. I also found out that the water commission will start looking outside the State to fill the geologist one and two slots they have because they have not seen any applicants locally that can pass the screening process.
Stephen Martel  
Professor  
Department of Geology and Geophysics

Neil - take a look at the requirements here (pdf advertisement for a State of Hawaii geologist position). Our graduates will have a tough time getting a job with the state without a Masters degree.  
Steve--  
Stephen Martel  
Professor  
Department of Geology and Geophysics

The program sounds quite good- particularly in that the 'culminating experience' final project will be derived from the work place, tying together the practical and academic parts of the degree in a way that should benefit both the student and employer. I think if the program had been available at the time of my graduation I might have taken a job with a local firm and gone for it.

Eden Jael Feirstein  
Dept. Hydrology & Water Resources  
Harshbarger Building Rm. 322A  
University of Arizona  
Office Tel: 520-621-7115

I received a memo from you regarding a proposed masters program, M.Geo, and I am interested in pursuing a masters. I graduated from G&G in May 2004 and I have been working for Earth Tech for a year. I would like to get a masters degree in Geology, but with this new possible option, M.Geo, I am not sure which way to pursue my interests. I would also be very interested in the MS degree also. Please e mail me, or call me at the below numbers with more information, or let me know when a good time to come by POST would be.

Carrie Plath  
Earth Tech, Inc.  
841 Bishop St. Suite 500  
Honolulu, HI  
96813  
P 808.356.5363  
F 808.523.8950  
R 808.523.8874  
carrie.plath@earthtech.com

As a recent UH B.S. Grad, I would be very interested in this program. I am currently working with Mountain Edge Environmental, Inc. The program sounds excellent; however, I do believe that a technical writing course should be required as well as a final paper.

My personal challenge for this program is my husband is military and he is up for a duty change at the end of 2007. I am not sure if this program would be in effect before I left, but if so...SIGN ME UP!

Angela Peltier  
Mountain Edge Environmental, Inc.  
62-180 Emerson Road Haleiwa, HI 96712  
Cell Phone: (808) 551-3740  Phone: (808) 637-1200  Fax: (808) 637-0001

I am writing to express my interest in the proposed  
M.Geo Degree discussed in your letter on the
Department's homepage.

I am Professional Geologist presently working for a geotechnical consulting firm in California. I currently have a Post Graduate Diploma in Engineering Geology from the University of Canterbury in New Zealand. The Diploma represents one year of post-grad course work in subjects related to engineering geology.

Although my present expertise is in the field of engineering geology, I am very interested in active volcanism and plan to apply to the University of Hawaii as a graduate student. I hope to start studying next spring.

My long term goals are to teach, conduct research, or work for a government agency in a scientific role. Would the proposed M.Geo degree be suitable for someone with my background and aspirations? Would the M.Geo be suitable preparation for moving on to a Ph.D.?

I appreciate any advice or information you can offer.

Mark Davis, PG., REA.
geojobhunter@yahoo.com
805 794 5750
geojobhunter@yahoo.com

Have you made any progress on getting this program set up? I am definitely interested in the program. I believe there may be one or two other individuals in our office interested as well.

I certainly hope that enough folks are interested that the program will get initiated. We have very few opportunities here in Hawaii for additional training or workshops, and this would be a good way to really get some focused study. It also seems that it would be a good way to infuse some of the practical information gathered in the consulting world into the geology program at the UH - a way for those of us that have been out there working to share information/experience we have gained on projects with others in the geology program.

Thanks,
Marc Dexter,
RG Project Manager CH2M HILL, Honolulu Office
1132 Bishop Street Suite 1100 Honolulu, Hawaii 96813 (808) 440-0248 phone (808) 538-8248 fax (808) 864-3591 cellular marc.dexter@ch2m.com

Is it too late for me (and/or the PTWC) to help you make this new Degree program a reality? I for one would be very interested! I'm sure that we could get Chip or Stu to write up a Letter of Encouragement, or whatever would help.

Barry Hirshorn
Pacific Tsunami Warning Center
I am writing to obtain more information about the Master of Geoscience that was posted on the G&G website.

I graduated from the University of Washington, School of Oceanography with a degree in Marine geophysics. For the last two years I have been working as a data processor for a small company in Seattle, WA that specializes in marine survey's using primarily sidescan and interferometry. I am currently looking to go back to school in a related field of study and the brief description that you gave in your memorandum sounded intriguing.

Am I qualified for the M.Geo. program? If so, where can I find more details about it?

Curtis Clement
Marine Geophysicist
Williamson & Associates
206-285-3273

I'm Tracy Ibarra and currently a senior in the G & G undergrad B.S. program. I am expected to graduate Spring 2008. I am interested in a professional degree and was hoping that the department was offering a program for it.

Currently, I work for the U.S. Geological Survey Water Resources Division in Honolulu. I have been an employee here since May 2005 under their Student Career Employment Program. The USGS and the university have a joining contract to employ me as a student until 2010. I would like to earn a professional degree with a focus on what I do here at the USGS, but do not know how to go about it or what the grand details are. Suggestions?

Tracy Ibarra