APPLICANT: Michael Ferguson

E-MAIL: mferguo@hawaii.edu

COURSE ALPHA and NUMBER: GG 103

COURSE TITLE: Geology of the Hawaiian Islands

ESTIMATED NUMBER OF SECTIONS:
Fall: 1
Spring: 1

APPLICATION IS FOR:
☐ New Course ☐ Modified Course ☐ Existing Course ☐ Re-designation

☐ Certification x Re-Certification. Date of last certification:

DIVERSIFICATION AREA DESIGNATION SOUGHT:
☐ DA (Arts) x DP (Physical Sciences)
☐ DB (Biological Sciences) ☐ DS (Social Sciences)
☐ DH (Humanities) ☐ DY (Laboratory)
☐ DL (Literature and Language)

What percentage of the CONTENT of this course focuses on this diversification area? 90

What percentage of CLASS MEETINGS focuses on this diversification area? 90
1. **Hallmarks and SLOs.** Please explain how course-specific SLOs align with the diversification area’s hallmarks.

DP.1 uses the terminology of the physical sciences;

SLO 1. Demonstrate an understanding of geologic principles including aspects of earth science, physics, chemistry and environmental sciences that are basic to current understanding of the Hawaiian Islands and their geologic processes.
SLO 2. Discuss the earth’s physical processes – external and internal process particularly those that bear on the geology of the Hawaiian Islands and Pacific Islands.
SLO 3. Demonstrate knowledge of basic geologic terms, locations, concepts, theories, and methodology.

For these SLOs (1-3) a working knowledge of the terminology of physical processes are needed. For instance, being able to describe how plate tectonics is applied to earth formations, volcanoes and other phenomena are key to this course. In order to accomplish this, the students need to have a working knowledge on how terminology is used in the physical sciences.

DP.2 involves knowledge and theories relating to processes in the physical sciences;

SLO 4. Recognize landforms, structures and products of volcanoes and other igneous phenomena.
SLO 5. Recognize and explain the existence of products of marine and terrestrial sedimentation in Hawaii.

As the students apply the scientific principles they learn in SLOs 1-3, they are required to apply them in SLOs 4 and 5. In doing so, they will apply the theories learned, like plate tectonics, and apply them to accomplish these SLOs. For instance, volcanism and its affect on the Hawaiian Islands will be covered as will the difference between chemical precipitation and sedimentation in the formation of sedimentary rocks. These topics covered under these SLOs show how the hallmark is satisfied in this course.

DP.3 demonstrates inquiry that involves observation/experiment and reasoning and mathematics.

SLO 4. Recognize landforms, structures and products of volcanoes and other igneous phenomena.
SLO 5. Recognize and explain the existence of products of marine and terrestrial sedimentation in Hawaii.
SLO 6. Recognize Hawaiian landforms produced by various weathering and erosion processes.
SLO 7. Discuss humans’ interaction with the geologic environment, vulnerability to geologic hazard, and dependency on natural resources.
SLO 8. Discuss the important aspects of the regional and historical geology of the Hawaiian Islands.
These SLOs, 4-8, all involve students taking data and evaluating those data. The Data is from observational and experimental sources. The analysis includes logical reasoning and mathematics. For instance, students will have to determine how volcanism affects Hawaii versus how volcanism affects other volcanically active places like Yellowstone or Pompeii. In this analysis the students are required to logically approach the problem of its effect on the environment and the landscape. This approach includes taking experimental data and interpreting the results with logic. From that fact, these SLOs fit the hallmark.

2. **Assessment strategies.** Explain assessment strategies you have used (or plan to use) to measure the degree to which students exit the course with the course-specific SLOs. If there are multiple sections of the course taught by different instructors, please discuss how assessment is (or will be) carried out across instructors.

There is formal feedback in terms of formative assessments during the lecture and summative tests. The formal formative feedback is in terms of classroom discussions. These formative assessments are a part of the course grade. The formative assessments also provide instant feedback to the instructor to see if the students understand the material.

The summative tests are multiple choice. The test questions are based off of the SLOs, for instance some of the terms in the scientific method are directly tested. There are various types of multiple choice questions that are used in assessment. For instance, some questions simply test knowledge like in defining the terms in the scientific method. Also, there are questions based off of evaluations to determine if an agriculture system is in fact sustainable. Also there are various other types of questions like comparative questions between different theories, application type problems for environmental impacts, etc.

Students also have to present research reports. These reports will test to see if the students understand the “big picture” aspects of this course.

At the end of the term, course evaluations are passed out where the students can assess the course instructor and content. The student evaluations give direct feedback to the course. There is only one instructor teaching this course per term.

3. **Assessment of assessment.** How have you used (or plan to use) the assessment findings to modify or improve this course? If there are multiple sections of the course taught by different instructors, please discuss how review of assessment results is (or will be) carried out across instructors.

In a course like this, one of the important issues is to make the course applicable to the students. From this, as much as possible, current events (in terms of geologic events, pollution, laws, etc.) should be included in course curriculum. From the class discussions, it will be apparent where the students’ interests lie. From that feedback the course can evolve to best fit the students’ curiosities and passions. This will be done at the end of each semester that the instructor teaches the course.
DIVERSIFICATION BOARD DECISION:

☑ Approved
Re-Certification Due: Fall 2017

☐ Not approved
If not approved, reasons for disapproval:

Diversification Board Chair Signature: [Signature]
Date: 8/10/12
GG 103, 3 credit hours DP

Geology of Hawaiian Islands

Nasir Gazdar, Ph.D., MPH  Email: nasir@hcc.hawaii.edu; Phone: 845-9846, Bldg5-101C
Office Hours MW 9:00-10:00am, or by appointment via email.

Geology of Hawaiian Islands
Survey of Hawaiian rocks, minerals, volcanism, erosion, sedimentation, landscape evolution,
geologic history, and regional geology.

This course fulfills a physical science requirement for Honolulu CC for the AA degree, and a DP
requirement for UHM

Companion Course website: http://www2.hawaii.edu/~nasir
GG 103 Laulima Web Resources
Geology website: //www.prenhall.com/tarbuck

Course Outline:
Hawaiian geology and geologic processes: origin of Hawaiian Islands, volcanism, rocks and
minerals, landforms, stream and coastal processes, landslides, earthquakes and tsunamis,
groundwater, geologic and environmental hazards.

Requirement for Course Credit and Grading:
Class Attendance Requirement and Participation: Student participation in class is very
important. Attendance in lecture is required. Exams and quizzes emphasize material covered in
lectures, in text, on course website, and at GG 103 Resources Folder at MYUHPortal Laulima.
Learning is from the class lectures, PPTs from the website, Laulima Resources, text chapters,
and/or assignments for specific lecture topic in GG 103. Email for any additional files, lecture
study guides, PPT files, geologic information, resources and events.

Grading:
Course Requirements and Assessment
Course requirements: GG 103 deals with the learning of principles and practices in geological
sciences. Students are required to focus on learning and should follow the guidelines such as:
1. Attend class regularly, and learn about topic before coming to class by studying the relevant
PPTs/chapter(s). A minimum of one hour of studying on a daily basis is highly recommended.
2. Participate in class discussions and take accurate notes of lectures and discussions
3. Complete all assignments on time. Plan ahead and take a head start in the initiation of work.
4. Prepare thoroughly for exams and assignments; student is responsible for all class assignments.
5. Email/inform your instructor of any problems that keep you from completing assignments on
time, or from taking exams at specified times. Note that you should email your instructor ahead
of time if you are going to miss an exam, and be prepared to make up exams or assignments in
next class session.
6. Pop-quizzes and extra credit will be announced periodically in the lecture sessions.

The grade in the course is based cumulative scores from all the work performed during the
semester. Exams/quizzes are a combination of multiple choice questions, true/false, matching,
geologic features, and applying critically thinking in landforms recognition. The work includes:
Three exams (1st term, midterm, 3rd term) each of 150 points total  450 points
Final exam, comprehensive  400 points
A research PPT presentation in class  150 points
Total points  1000
Scores will be calculated on cumulative points earned out of 1000 points. Grade will be based on percentage (%) as:

Grade (%)  A= 90+,   B= 80-89,   C= 70-79,   D= 60-69,   F= 59 and below.

Student Learning Outcomes:

Upon completion of this course, students should be able to:

- a) Demonstrate an understanding of geologic principles, including aspects of earth science, physics, chemistry and environmental sciences that are basic to current understanding of Hawaiian Isles and their geologic processes.
- b) Discuss the earth's physical processes, particularly those that bear on geology of the Hawaiian Isles and Pacific Isles.
- c) Demonstrate knowledge of basic geologic terms, locations, concepts, theories, and methodology.
- d) Recognize landforms, structures and products of volcanoes and other igneous phenomena.
- e) Recognize and explain the existence of products of marine and terrestrial sedimentation in Hawaii.
- f) Recognize Hawaiian landforms produced by various weathering and erosion processes.
- g) Discuss humans’ association with the geologic environment, vulnerability to geologic hazard, and dependency on natural resources such as groundwater, and environmental impacts.
- h) Discuss the important aspects of the regional and historical geology of Hawaii Isles.

Supplementary Materials and Resource Information Center:

Assigned readings, websites, current geologic events, videos, software, handouts, laboratory exercises, and field excursions are part of the learning process and critical thinking. HCC (www.hcc.hawaii.edu) Library and UH Manoa Library holdings related to geological journals, books, videos, topographic sheets and maps are available to students.

Withdrawals from the Course and Incomplete Grade:

The Natural Science Department policy on Withdrawals from courses and Incomplete Grades is as follows:

1. Withdrawals (“W” Grade): After the “last day for withdrawals”, which is found on the calendar in the schedule of courses, the instructor will sign withdrawals only in cases of extreme or unusual circumstances. Grade related excuses are unacceptable. Examples of extreme or unusual circumstances are: (a) a certified medical reason, or, (b) a death in the family. Students who no longer attend class and who DO NOT OFFICIALLY WITHDRAW from the course will receive “F” grades. The last day for all withdrawals is March 22, 2012.

2. Incomplete (“I” Grade): Students must present the “Request for Incomplete Grade” form prior to the last day of instruction. “I” grades will be given only to students who are achieving passing grades and are very close to completing the course. In addition, the student must have a very good reason for not being able to complete all of the work on time. Examples of good reasons are the same as those listed under the “withdrawal policy” above.

(i) Honolulu Community College is an Equal Opportunity/Affirmative Action Institution.
(ii) Disability Qualified students who request and require disability-related accommodations should contact the Student ACCESS office in Bldg 7, Room 319 or at 844-2392 (voice/text) to receive timely accommodations. Please make an appointment the first week of class to see me & provide me with a current verification letter from Student ACCESS in regards to specific approved accommodation(s) for this class. In additions, students needing emergency evacuation assistance shall inform instructor and Student ACCESS.

(iii) Students are expected to attend all classes for which they are registered. If a student is unable to attend class, he or she should contact the instructor in advance to give notification of the absence and make the necessary arrangements. (iv) For those students who receive financial aid and fail to attend the first week of classes without making arrangements with the instructor, the instructor will submit the student’s name to the Financial Aid Office. The student will be denied financial aid for the class that he/she is not attending. In addition, it is solely the student’s responsibility to withdraw from the class or attend the class and pay tuition.

(iv) Phones, Pagers, mobile and cell phones are to be quieted during class time. All calls and text messaging are to be done outside the classroom. Please kokua.

HCC Statement on Student Responsibilities- Student Code of Conduct:

In instructional activities, students are responsible for meeting all of the course's attendance and assignment requirements. Failure to do so may affect their final grade. In all college-related activities, including instruction, they must abide by the HCC’s code of Student Conduct and regulations. Topmost responsibility is refraining from behavior that interferes with the rights and safety of others in the learning environment. Finally, if they decide to file a grievance, they are fully responsible for providing proof that they have been wronged.
Disclaimer: Schedule of discussion topics is tentative. Each topic will be discussed in the order listed, although I reserve the right to change that order. Hence, attendance in class is mandatory. Depending on class participation, certain topics may require more or less time to discuss adequately, which may alter the proposed schedule. The schedule may be modified later in the session by deleting and combining some of the topics, or adding.

Schedule of Assignments: Please study from the PPTs on Laulima, GG 103 Course Website, http://www2.hawaii.edu/~nasir and the textbook

**Week 1:**

Introduction Chapter from the Text
Science and Geology, the nature of scientific inquiry, Earth's Place in the Solar System, Earth as a geosystem, its multidimensional aspects, major spheres in the Earth System, Lithosphere, Atmosphere, Hydrosphere, Biosphere, Pedosphere, Anthroposphere.

**Week 2:**

CH 2 Hawaiian Volcanic Activity, CH 16: Age of the Islands
Origin of the Earth, Structure of the Earth - Core, Mantle, and Crust, Internal Processes and External Processes, Lithosphere and Volcanoes, Plate Tectonics and Hotspots, Age of the Hawaiian Islands.

**Week 3**

CH 4: Hawaiian Rocks and Minerals

First Exam

**Week 4**

CH 8: Rock Weathering and Soils, CH 15: Sedimentary Rocks

**Week 5**

CH 10: The Hydrologic Cycle and Stream Erosion
Work of running water in shaping the landscape, erosion, transportation; deposition and landforms. Hydrologic Cycle - recycling of water in Hydrosphere, Land and Atmosphere.

**Week 6**

CH 11: Groundwater in the Hawaiian Islands
Water resource, occurrence of groundwater, wells and springs water supplies and seawater intrusion.

**Week 7**

CH 12, CH 13 Works of the Wind and Ice
Processes, deposits and erosion by wind and glaciers, deserts, and climate changes.

Second Exam

**Week 8**

CH 14 Work of the Ocean
Beaches shorelines and coastal landforms, Ocean Environment, ocean basins, ocean floor, mapping the ocean floor, features of the ocean floor, Marine Geology of Hawaiian Isles.

**Week 9:**

CH 14 Work of the Ocean
Coastal processes and oceanic circulation, Waves, Tides, Currents, Shoreline erosion problems, vanishing coastal wetlands, reefs and volcanic oceanic islands.

**Week 10**

CH 17: Rock Deformation, Earthquakes and Tsunamis
Internal geologic processes, forces within the Earth, Earthquakes, Rock Deformation, Plate Tectonics, Trenches and Mid Oceanic Ridges, Tsunamis, 'Ring of Fire' surrounding Pacific Ocean Rim.

Third Exam

**Week 12**

CH 3: Volcanoes, Igneous Rocks
Nature and processes in Volcanic Eruptions, structures and products of volcanoes and igneous phenomena

**Week 13**

CH 18: Plate Tectonics and Origin of Hawaiian Islands
Continental Drift, Seaflooring Spreading, Theory of Plate Tectonics, Origin of Hawaiian Islands, Regional Geology of Island of Hawaii

**Week 14**

CH 20, 21, 22 Regional Geology and Historic Eruptions
Regional Geology of Islands of Maui, Molokai, Lanai, Kaho'olawe, Oahu, Kauai and Niilau.

**Week 15**

CH 19: Geologic Resources
Geothermal Energy Resources, generation of energy and production of electricity from the hot lava rocks, volcanic hot springs and volcanic steams, final exam review.

Week 16 Final Exam May 12, 2011

Research PowerPoint Class presentation - 150 points or 15% of grade
We satisfy our natural curiosity of the world we live by understanding the Earth's internal and external processes. The planet Earth and its life supporting systems are vital for our existence. Understanding of Earth systems and resources is through exploration in geosciences. Through the application of principles and practices in geological science, the learning is enhanced in our understanding of the Planet.

The purpose of research is to explore a specific site or a topic in the scope of the Geology of the Hawaiian Island chain and on the earth we live in. The emphasis may be on any geologic aspect such as: the origin of the Hawaiian Islands, volcanoes, earthquakes, tsunamis, external and internal geological processes, natural hazards, geothermal resources, surface water and groundwater resources, environmental change, geological and environmental techniques, and geologic control on human environment.

Paper presentation in the class provides an expression of creative and reflective thinking for the participants. Paper will be either PowerPoint/Slides/Video presentation or a demonstration of a physical experiment; and should be presented in the class between week 3 and 14. Topic selection by the participants should be done by 3rd lecture and topic will be discussed with the Instructor for information sources and references. Use of field studies, Internet Websites, library and information-based media, and awareness of current geologic events is recommended. Presentations will start from 3rd lecture onwards corresponding to the topics being discussed in the class.

Research will be presented in the class in a lecture or a fact-sheet format of 15-50 minutes duration. Research may include one or more of the following geologic aspects of Hawaiian Islands and its environs:

New scientific aspects of the regional and historical geology of Hawaiian Isles.

1. Analyze geologic forces and processes at work in Hawaiian Isles, Landforms, structures and products of volcanoes
2. Internal and external processes and geologic materials on the landscape of the Islands.
3. Use of geophysical and geographical information system (GIS) technology in supporting the scientific study of Earth, lithosphere, hotspots, oceans, global climate change and sea level rise.
4. Evaluate human interactions with the Earth System in Hawaiian Isles and environmental impacts.
5. Geologic hazards and risks, increase human activity in the Hawaii and the Pacific Isles,
6. Marine geologic processes and exploitation of Isles ocean resources, reefs, and marine pollution.


Field trips (optional) to be announced.