Appendix B-6

GE-Recertification, 2012

GEOL 103

Earth Systems and the Environment
Earth Systems and the Environment
Geology 103 (03) 26010
San José State University
SPRING 2012

Days and time: T/TH 12:00-1:15  Room: DH 306  Office: DH 314
Instructor: Joe Petsche
Campus phone: TBA (email is best method of communicating with me)
E-mail: chertnode@yahoo.com (or email me via D2L (Desire 2 Learn))
Dept of Geology, SJSU, San José, CA 95192-0102
Office hours: Tuesdays/Thursdays: 10:30 – 11:45 or before class, if urgent
Office: Room 314 in Duncan Hall. Right across the hall from the geology office

Catalogue Description
Fundamental Earth/space science concepts. Emphasis on active learning and
guided inquiry. Recommended for students preparing for multiple subject credential.
Prerequisites: Chemistry 30A or Physics 1; Completion of core GE, satisfaction of
Writing Skills Test and upper division standing. For students who began continuous
enrollment at a CCC or a CSU in Fall 2005 or later, completion of, or co-requisite in a
100W course is required. Notes: Offered through International and Extended Studies.
Units: 3. General Education: R2.

Required Textbook
McConnell, Steer, Knight, Owens, and Park. The Good Earth: Introduction to
Earth Science, McGraw-Hill Higher Education. You can buy an earlier edition; you do
not have to buy the edition the bookstore carries. You can buy the book on-line if you
wish. YOU WILL NEED THIS BOOK!

I DO NOT LECTURE DIRECTLY FROM THE BOOK

You are required to read the material from the book BEFORE you come to class. There’s
a lot of information and not that much time, so it’s your responsibility to review material
before I lecture about it.

Course Objectives:
The overarching goals of this course are to:
• Present a multidisciplinary view of planet Earth and its place in the universe through the
  study of fundamental concepts in geology, oceanography, meteorology, and astronomy.
• Understand that our home planet is part of a larger universe (cosmosphere) and is made
  of four major spheres (geosphere, hydrosphere, atmosphere, and biosphere), which
  interact as part of a complex and continuously changing whole called the Earth system.
• Describe the spatial and temporal scales of change that affect the Earth system.
• Examine interactions between humans and the Earth system.
• Gain an appreciation for the uniqueness of Earth.
How Geology 103 Addresses SJSU General Education Guidelines for Area R

1) In order to demonstrate an understanding of the methods and limits of scientific investigation, you will: a. Examine changing views of our planet based on satellite coverage, Space Shuttle images, and sophisticated computers that allow increasingly more complicated models of global processes; b. Describe how the evolution of plate tectonics theory reflects testing and rejecting of hypotheses and revising of hypotheses in response to the acquisition of new data.

2) In order to distinguish science from pseudo-science, you will: a. Evaluate the validity of “marginal science”; b. Critically assess the claims of historical examples of pseudoscience.

3) In order to apply a scientific approach to questions about the Earth and environment, you will: a. Explore both sides of a controversial environmental issue by looking at real-world data; b. Predict past and present climate based on various lines of evidence and influential factors. c. Utilize various pedagogies to research important scientific issues.

SJSU requires that 3,000 words worth of written assignments are to be assigned for Area R classes. These written assignments will be spread throughout the semester, and will include several discussions (to be graded on D2L), an essay, and the end of the semester project, among others.

Course Logistics

We’ll meet twice a week in the classroom for lecture and discussion, slides, videos and other random classroom activities. Sometimes we will go outdoors for a bit. There aren’t any field trips in this class.

You must be able to access the Web (or a library) to complete some assignments. SJSU provides appropriate computing facilities if you do not have a home web connection. You will need a log-in and password for D2L.

Classes will normally include power-point presentations. These will be available on D2L for you to download, as well.

Extra Credit: Nope! Just do a good job, and you’ll get a good grade.

Policy on academic dishonesty: Your own commitment to learning, as evidenced by your enrollment at San José State University, and the University’s Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Student Conduct and Ethical Development. As a student at this university, you are expected to read, know, and abide by the policy on academic integrity (at http://sa.sjsu.edu/student_conduct).

Any student caught plagiarizing will be dropped from the class.
Drop policy: It is the policy of the University and this Department that dropping a course is permissible only for serious and compelling reasons. Unsatisfactory performance in course work is not a serious and compelling reason in itself for requesting permission to drop. IT IS YOUR OWN RESPONSIBILITY TO DROP YOURSELF!! I WILL NOT DROP YOU IF YOU SIMPLY STOP SHOWING UP!!

IMPORTANT DATES:

Monday, Feb 6: Last day to drop

Monday, Feb 13, Last day to add

Students are responsible for understanding the policies and procedures about adds, drops, academic renewal, withdrawal, etc. (http://info.sjsu.edu/static/catalog/policies.html).

Compliance with the Americans With Disabilities Act: If you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities register with the Disability Resource Center (924-600, located in ADM 110) to establish a record of their disability.

San José State University policy states that classroom behavior and expectations are based on personal integrity and respect. Disruption due to late arrivals, early departures, talking with another student during class time or regular interruptions of the class flow will not be tolerated. Questions, participation with discussions and constructive comments are encouraged.

Grade Breakdown:
90-100+% A
80-89% B
70-79% C
60-69% D
0-59% F
Students and teachers must compromise. I will try my best to present information in a clear and logical manner, and I will grade assignments fairly. This is not a “weed-out” class. I want you to pass. I will be as available as possible to answer questions and help you through the class. I will grade and hand back assignments asap.

In return, this is what I am expecting of you:

1. You show up to class on time.
2. You pay attention and take notes.
3. Taking notes on your computer is only okay if you have a legitimate excuse. Otherwise, laptops and hand-held devices are prohibited from usage during class.
4. You do not cheat or plagiarize.
5. You give a crap (figuratively of course)
6. If you have questions or are confused, be sure to let me know! You don’t even have to raise your hand during class if you have a question or need me to slow down.
7. Don’t be shy and be willing to work in groups.

Below are the assignments that your overall grade will be based on. They are summarized here, and I will further explain them in class.

**Assignment #1 (5% of grade) DUE Feb 6th:** During the second class meeting (Jan 31), we will discuss science, pseudoscience, and the blurred and transitory boundary between the two. You will have to write a 200-word discussion in D2L expressing your opinion of a topic I will introduce in class that day. Due on D2L discussion board by Feb 6th by 11:59 p.m.

**Assignment #2 (5% of grade) DUE Feb 6th:** This will be a 200-word discussion about this topic:

If you were on the moon…

- Would you see the Earth move across the sky?
- Would the earth go through phases like the moon does?
- If so, would these phases be the same length as we see on the moon?
- Is there a permanent dark side of the moon?

Your answers will NOT be graded on accuracy, but instead on effort. This is an assessment of prior knowledge, but some information will be provided in class to guide your response. Due on D2L discussion board by Feb 6th.

**Assignment #3 (5% of grade) IN-CLASS, FEBRUARY 14th:** This will be a fast-paced, guided group activity that will take place in class on Feb 14th and will be handed in that day. The purposes of this assignment are:

- Familiarize yourself with the “Jigsaw” Pedagogy
• Learn how multidisciplinary lines of data can support each other to create one of the Earth Science’s newest, yet most important theories; Plate Tectonics

Assignment #4 (5% of grade) IN-CLASS, FEBRUARY 28th: You will work in groups to complete a guided in-class activity exploring the methods of categorizing minerals and rocks based on their various properties. It will be handed in that day.

Assignment #5 (10% of grade) DUE APRIL 3rd: On March 20th, we will watch a movie about the availability of water in California, and to what measures we as a state have gone to in the quest to quench an ever-growing population. The movie “Chinatown” is loosely based on these real events, but we will watch a documentary called “Cadillac Desert, based on a popular non-fiction book of the same name. You will write a 3 page Earth System Science (ESS) analysis about the effects of water diversion on the ecosystem and population of Owen’s Valley. More details will be explained in class. This will be due April 3rd and should be a word document form that you will upload to D2L.

Assignment #6 (5% of grade): On April 3rd, we will do a guided in-class activity titled “Climate on an Imaginary Continent”. This activity will explore the factors that influence today’s climate. It will be handed in that day.

CAUSAL CHAIN ASSIGNMENT:

This assignment has three parts. The first two parts are to be done individually. The third part is to be done in groups of 4-5 people each.

Part 1: (Prior Knowledge; 5% of grade) Write a discussion (informal; not essay-style) about what you know about climate change. If you don’t know much, explain what you would like to know. Also be sure to explain why you know what you know (in other words, where did you learn it), and how much you trust what you know about climate change. One page minimum; grade based on quality of answer, (obviously not based on how much you know). You will hand in this one as a hard copy.

Part 2: (Become an expert in your “Sphere”; 5% of grade) This is the part where you do some research. Part of Problem-Based Learning is to identify weaknesses in your foundation of knowledge, ask the appropriate questions to fill these holes, and then do research to answer them. You will choose (or be assigned) a “sphere” to study the effects of climate change on it. Parts 1 and 2 are DUE March 22nd, as a hard copy.

Part 3: (ESS Analysis; 15% of grade) You will form a group made up of a person from each area of expertise (Hydrosphere, Atmosphere, Geosphere, Biosphere). You will make an ESS assignment (handed in as ONE group assignment). You will all get the same grade on the assignment! We will discuss this more in class. (Due May 3rd)

EXAMS:
Midterm Exam and Final Exam (consists of multiple choice questions; both are worth 20% so that the total portion of your grade from Exam work is 40%). Final exam is not cumulative. No notes allowed during test.
COMMEN[TARY ON HOW GEOLOGY 103 ACCOMPLISHES GE (AREA R) STUDENT LEARNING OBJECTIVES

The integrative nature and content of Earth System Science makes this course well-suited to meet the SLOs of Area R. In a general sense, the entire course is focused on the Earth and environment. In the following, each of the SLOs is discussed.

1) **Students in Geology 103 demonstrate an understanding of the methods and limits of scientific investigation in the following ways:**

a) Through comparisons of aerial and satellite photography of major floods, receding glaciers, volcanic hazards, plate boundaries, and other geologic events and features.

b) Through group collaboration of students who have become “specialized” in particular data sets concerning the location of plate boundaries. These groups contain students versed in each “specialty” (e.g., seismology, volcanology, etc.) and produce a collaborative, multi-field description of each type of plate boundary.

c) Limits of scientific investigation are also explored during the assignments listed below under SLOs #2 and #3.

2) **Students in Geology 103 distinguish science from pseudoscience in the following ways:**

a) Students employ critical thinking skills and understanding of science and pseudoscience to explore the limits of scientific investigation within the context of “marginal” science and investigations of “paranormal” phenomena from a skeptical point of view (see Assessment Report in Fall 2011).

b) Students question both sides of the debate over climate change and explore the evidence concerning past climate change (e.g., Vostok Ice Cores) and how it relates to studies of current atmospheric concentration of several greenhouse gases.

3) **Students in Geology 103 apply a scientific approach to questions about Earth and the environment in the following ways:**

a) Through historical investigation of the impetus behind, and effects of, water acquisition and consumption over the past century and a half in California.

b) Through the use of various lines of evidence to predict climate change in the near future, and it’s effects on the San Francisco Bay Area and the Central Valley.
c) Through the Earth Systems approach of designing and implementing research plans for the
collection of data pertaining to natural and man-made phenomena and their ripple effects on
related systems, such as the atmosphere, hydrosphere, biosphere, and geosphere.

d) Through the interpretation of seismicity to locate the epicenter of an earthquake. Students
interpreted seismograms to collect data for triangulation in the identification of the epicenter of
two earthquakes—the 1989 Loma Prieta earthquake and an earthquake along the New Madrid
fault zone.

e) Through adaptation of the methods of absolute and relative dating to determine the order of
geologic events. Students applied relative dating principles in the construction of a composite
stratigraphic column, to determine the order of events depicted in a cross-section, and to
determine the age of strata based on index fossils. Students also apply absolute dating
techniques to determine the age of a log found in glacial till, artifacts found in a pyramid in
Dashur, Egypt, and human remains found in volcanic ash.

Because of the interdisciplinary nature of Earth Science and this course, the instructors
have devised other activities and assignments that integrate all of the SLOs. As an example, one
instructor utilizes the following activity. Students watch a video clip of George Stephanopoulos
interviewing House Speaker John Boehner. The viewing is followed by discussion of global
climate change, interpretation of scientific evidence, and the economic and political factors
involved in development of adaptive strategies. Students engage in the following activities: 1)
using the scientific method, they work in teams to design an experiment to test whether climate
change is occurring; 2) they then conduct a greenhouse gas experiment in which the temperature
of the air contained in a biosphere created using a 2 liter bottle is compared to a biosphere of
equal volume to identify the effect of the greenhouse gas on temperature; 3) after data
collection, the results are analyzed and interpreted; and 4) where applicable students design a
course of personal action and propose societal changes.
In our view, the instructors are continuing to improve student success at meeting the SLOs. More specifically, the instructors for Geology 103 utilize a number of required assignments that address the objectives from several perspectives. The overall curriculum of the class is designed to make certain that students learn the key concepts of the GE SLOs.

SLO #1 is assessed through lectures and in-class activities. In one such activity, students are separated into groups, each with a different map showing a particular data set. There are four different maps, focusing on seismology, volcanology, geography, and geochronology, respectively. Each group infers from their data where plate boundaries may be located, which students draw on a blank world map, and describe the criteria used to make these inferences. Once students in these groups have become “specialized” in one of these four data types, they split up and form new “multidisciplinary” groups that have a “specialist” from each of the four data sets. These new groups share their findings and come up with a consensus map of plate boundaries based on their collaboration. Students are also asked to combine their data to make comprehensive descriptions of two major plate boundaries: the mid-Atlantic ridge and the Chile-Peru subduction zone along western South America. The purposes of this assignment are to: 1) familiarize the students with the multidisciplinary approach to creating sound theories, and 2) demonstrate and practice the “jigsaw” pedagogy that this assignment is based on. The assignment is done during class, graded and handed back the following week. More than 90% of students satisfactorily (grade of C or higher) attain this SLO.

SLO #2 is evaluated through multiple assignments (see attached greensheet). In one assignment, students write a 200-word report on science, pseudoscience, and the blurred and transitory boundary between the two. A second assignment focusing on this SLO involves both an on-line discussion with a required response, as well as several questions on the final exam concerning the climate change debate. Most students (~90%) achieve a passing grade on these assignments and those that don’t generally put in little effort.

SLO #3 is a major focus of the course and much of the class covers some aspect of this SLO. One major assessment tool is a required assignment on climate change that includes in-class research in the computer lab and a group project that counts for 15% of the class grade. More detail is provided on this assignment (Casual Chain Assignment on page 5 of the attached greensheet). Due to this exercise and other built-in safeguards, no student can pass the class without meeting the requirements of this SLO.

As reported in previous Annual Course Assessment Forms for the class, the use of inquiry-based learning has increased along with that of several other pedagogies to provide a rich learning environment that emphasizes and demonstrates a variety of teaching skills. This is
beneficial to the students for several reasons. Faculty recognize that students have different preferred learning channels, and that their success in the class depends in part on the ability of the instructors to employ a variety of techniques while teaching so that all learning types are satisfied. Furthermore, many of the students in the class are pre-service teachers, and these students benefit from the demonstration of various approaches to teaching Earth Science in the classroom. Students are encouraged to use the activities conducted in class in their own classrooms, and over the past several semesters, many students have requested copies of these lessons for such a purpose.

Geology 103 is at the forefront of the Earth Systems approach to teaching Earth Science. This new framework is already beginning to show up in Earth Science textbooks at all grade levels and on many educational websites. The Department of Geology is, and has been for several semesters, well-equipped to utilize this approach. Both instructors of Geology 103 are members of ESSEA, the Earth Systems Science Educator’s Alliance. Annual meetings attended by these two instructors provide the opportunity to become familiar with the latest advancements in the field of teaching Earth Science, and to meet in person with representatives from colleges across the country as well as experts from agencies such as NASA, NOAA, and the US Geological Survey. This ongoing relationship with the country’s leading experts on Earth Science education has maintained Geology 103 as a pioneer of this new, advanced framework of teaching.

In summary, we judge that Geology 103 is successfully meeting the expectations of the SLOs and the instructors are continuously assessing and modifying the class as needed. We thus expect that the class will evolve, but that no major changes are needed.
General Education Annual Course Assessment Form

Course Number/Title: Geology 103 – Earth Systems and the Environment
GE Area: R

Results reported for AY: 2009-10

# of sections: 3

# of instructors: 2

Course Coordinator: Paula Messina
E-mail: Paula.Messina@sjsu.edu

Department Chair: Dr. Richard Sedlock
College: Science

Instructions: Each year, the department will prepare a brief (two page maximum) report that documents the assessment of the course during the year. This report will be electronically submitted, by the department chair, to the Office of Undergraduate Studies, with an electronic copy to the home college by September 1 of the following academic year.

Part 1
To be completed by the course coordinator:

(1) What SLO(s) were assessed for the course during the AY?

SLO 1: "Students can demonstrate an understanding of the methods and limits of scientific investigation."

(2) What were the results of the assessment of this course? What were the lessons learned from the assessment?

In three sections of Geology 103 (Earth Science and the Environment), 94% of students achieved mastery of the first component of SLO #1 (understanding of the scientific method). This conclusion was based on student achievement on individual test items, and required written assignments.

Students were assigned to examine changing views of our planet based on satellite coverage, space shuttle images, and sophisticated computers that allow increasingly more complicated models of global processes. The limits of scientific research were apparent to 100% of the students who took the course, since so much of what is understood is dependent of available technology. Toward that end, students performed an activity which was designed to demonstrate how the evolution of plate tectonics theory reflects testing and rejecting of hypotheses, and how hypotheses are revised in response to the acquisition of new data.

(3) What modifications to the course, or its assessment activities or schedule, are planned for the upcoming year? (If no modifications are planned, the course coordinator should indicate this.

Instructors of the course were satisfied with student success. The only modification suggested by one of the instructors was to include more inquiry-based activities in which students conduct scientific investigations. He believed that with more practice and explicit guidance, students could better internalize the methods of science.

Part 2
To be completed by the department chair (with input from course coordinator as appropriate):

(4) Are all sections of the course still aligned with the area Goals, Student Learning Objectives (SLOs), Content, Support, and Assessment? If they are not, what actions are planned?

Yes, the sections of GEOL 103 still is aligned with the GE requirements for Area R.
General Education Annual Course Assessment Form

Course Number/Title: Geology 103 – Earth Systems and the Environment  GE Area: R

Results reported for AY 2010-2011  # of sections: 8  # of instructors: 2

Course Coordinator: Ellen Metzger  E-mail: ellen.metzger@sjsu.edu

Department Chair: Robert Miller  College: Science

Instructions: Each year, the department will prepare a brief (two page maximum) report that documents the assessment of the course during the year. This report will be electronically submitted, by the department chair, to the Office of Undergraduate Studies, with an electronic copy to the home college by September 1 of the following academic year.

Part 1
To be completed by the course coordinator:

(1) What SLO(s) were assessed for the course during the AY?

SLO 2: “Students can distinguish science from pseudo-science.”

(2) What were the results of the assessment of this course? What were the lessons learned from the assessment?

The instructors employed a variety of hands-on and critical thinking exercises to address SLO 2. For example, one instructor asked students to assess the scientific method within the context of the paranormal, specifically the existence of ghosts. A ghost-hunting video was shown to illustrate methods used by paranormal investigators. Students were then asked the following questions: “Can you apply the steps of the scientific method to determine if a house is haunted? If not, explain which steps of the method could not be met and why, or, if so, design a study (indicating the individual steps) where you apply the scientific method to assess claims that a particular house is haunted.” In another section of Geology 103, the difference between science and pseudoscience was explored through two in-class experiments, class discussion around the methodology and interpretation of results, and a midterm quiz question requiring students to design an experiment to address a scientific question. Based on class and on-line discussions and exam questions, the instructors estimate that 85-90% of Geology 103 students achieved mastery of SLO 2; those who did not either did not hand in assignments on time or failed to grasp the concept of the assignment.

(3) What modifications to the course, or its assessment activities or schedule, are planned for the upcoming year? (If no modifications are planned, the course coordinator should indicate this.)

Both instructors are satisfied with student success for this learning objective.

Part 2
To be completed by the department chair (with input from course coordinator as appropriate):

(4) Are all sections of the course still aligned with the area Goals, Student Learning Objectives (SLOs), Content, Support, and Assessment? If they are not, what actions are planned?
Yes, all sections of Geology 103 still meet the GE requirements for Area R.
Appendix B-7

GE-Recertification, 2012

GEOL 105

General Oceanography
GENERAL OCEANOGRAPHY
Geology 105 – Spring 2012
Section 80
San José State University
Greensheet – (Ver. 2 – 1/26/12)

Instructors: Don Reed (yes, I am a doctor, Ph.D., and full professor, but just call me "Don")

Office Location: 305 Duncan Hall

Telephone: (408)-924-5036 (not the best way to reach me)
Voicemail will be checked once a day on Mon., Tues. Wed. and Thurs.

Video Conference: Elluminate (http://elm.elluminate.com/HOSTEDSJSU), Skype (dred100) or Video iChat by request

Email: Use Mail within Desire2Learn for all communication, as it is the best way to reach instructor. All Mail to the instructor in Desire2Learn will be answered within 24 hours of being received, Monday through Thursday. Email sent on Friday may not be answered until Monday afternoon. If Desire2Learn is down, use oceansjsu@yahoo.com

Office Hours at SJSU: Between Jan. 25 and Feb. 20: M 3:00-4:00; After February 20: M 12:50-1:50

Online Office Hours: T 1:00-2:00, TH-F 11:00-12:00 or by appointment; phone and videoconference available

Course Websites: http://sjsu.desire2learn.com/ Assignments: http://oceansjsu.com

Prerequisites: Completion of all core GE courses, completion of WST test, completion of, or co-registration in, 100W, and passing score on ELM Test and Math 7 (Intermediate Algebra) or equivalent.

Students must have access to a computer with speakers and a high-speed connection to the Internet (DSL, Cable or T1).

GE/SJSU Studies Category: Area R: Earth and Environment

Course Website and Use of Desire2Learn

We will use Desire2Learn (https://sjsu.desire2learn.com/) for accessing weekly assignments, called expeditions, electronic discussions, email, submitting graded assignments, and taking quizzes and exams.

Information on using Desire2Learn can be found at http://www.sjsu.edu/ecampus/students/
Course Description
This course will focus on the scientific examination of the impact of the oceans on global society, and human impacts on the oceans, through web-based exercises, bulletin board discussions, and field studies of local shoreline habitats. This course meets Area R for SJSU Studies requirements. Courses to meet Areas R, S, and V of SJSU Studies must be taken from three different departments, or distinct academic units.

Course Goals and SJSU Studies Area R Student Learning Objectives
Upon successful completion of this course, students will be able to:
1) appreciate the methods and limitations of scientific investigations of the global ocean; (Learning Outcome #1)
2) distinguish between science and pseudo-science; (Learning Outcome #2)
3) apply the methods of science to a problem involving the earth and environment; (Learning Outcome #3)

Students will also increase their understanding of:
1) the connection between the ocean and global society,
2) the ocean ecosystem and its life forms,
3) the interactions between the ocean and climate,
4) oceanography as a global science of special interest to diverse societies of the Pacific Rim, including the multicultural population of California

Required Reading Assignments and Course Workbook ("Reader")
There is no textbook, instead reading assignments will be assigned each week and downloaded from course website.

A required course workbook, also known as a “reader” can be downloaded and then printed or purchased as a hardcopy at A.S. Print Shop on campus, located in Hoover Hall between the 7th Street Parking Garage & the Aquatic Center beginning on Wednesday, February 1 for approximately $16. The contents of the workbook also can be downloaded from course website, assignment by assignment.

Other equipment / material requirements
Colored Pencils (necessary for completing diagrams in expedition worksheets
Calculator (necessary for online work and exams)

Nature of Weekly Work and Responsibilities of Students
Students will play an active role in their learning through the timely completion of online virtual expeditions in which students take on the role of a research oceanographer. Students will participate in an average two self-paced virtual expeditions each week. For national accreditation purposes, the university requires
that a three-unit, semester-long class consists of 2.5 hours of instruction each week; an online class takes at least this much time and more, in most cases, because of the heavy reliance on reading and writing for communication with other students and the instructor. Students are also required to participate in electronic discussions, often problem-based and issue-oriented, with other students on issues presented in reading assignments. Online “class time” does not include time required for the assigned readings, writing assignments, including discussions, or preparing for exams, as this is “homework” just as you would have in classroom sections.

Our expeditions, which replace classroom lectures, are web-based exercises that provide a self-paced tutorial on the subject matter, composed of text, graphics, animations, and short segments of newscasts in streaming audio/video. Students work their way through an expedition by viewing the pages and writing answers to questions in the course worksheet and taking notes. These answers and diagrams serve to highlight the most important information and will provide the notes from which to prepare for exams. Students are strongly encouraged to post any questions or thoughts on the contents of a particular expedition in the associated “Any Questions” discussion for each expedition on the Desire2Learn site.

Answer keys are only provided for expeditions 5 through 12, which represents the material covered on exam #1. By expedition 13, students will be very familiar with the expedition format, the use of the worksheets to study and the types of questions asked on exams, consequently answer keys are not provided for expeditions 13 through 19. Instead, it is my sincere hope that students assess their own learning at this point in the class and post any questions on the material in the appropriate discussion area so that we can learn as a community, engaging other students in a dialogue to enhance our understanding of the scientific investigation of the ocean.

At the end of all expeditions, except those with required discussion postings (#1, #9, #16, #21 and #22), students are required to send a “Bye Don” email within the course area of Desire2Learn to confirm completion of the work. Instructions on sending the Bye Don email or posting in an electronic discussion are given on the last webpage of these expeditions – just follow the directions and students should know how to proceed. Students are encouraged to ask questions about the material in the expedition discussion areas or by Mail in Desire2Learn to gain insight from fellow students and for the instructor to provide suggestions, additional information and clarification.

New expeditions will be posted on Tuesday at 12:00 PM of each week and are to be completed according to the dates listed in course schedule, generally one expedition by Friday at 11:00 AM of the same week and another by Tuesday at 11:00 AM of the following week. This schedule varies, so please consult course schedule for details.

**Dropping and Adding**

Students are responsible for understanding the policies and procedures about add/drops, academic renewal, etc. Information on add/drops are available at http://info.sjsu.edu/web-dbgen/narr/soc-fall/rec-324.html. Information about late drop is available at http://www.sjsu.edu/sac/advising/latedrops/policy/. Students should be aware of the current deadlines and penalties for adding and dropping classes.
Assignments and Grading Policy

Grades in the class are based on combination of assignments, listed individually below, resulting in a total of 1000 points. No extra credit is available in the class.

Area R Writing Requirements

It is now required that all SJSU Studies GE courses have at least 3000 words of written assignments, which is about 12 pages. SJSU course regulations also specify that this requirement be spread across more than one assignment in order to give appropriate feedback on the quality and form of writing. Every writing assignment will promote reflective processes and critical analysis while being assessed for grammar, clarity, conciseness and coherence. In this class the 3000 word requirement is covered by the four Desire2Learn discussion assignments (a total of about 1050 words), an essay on the science of marine fisheries assessment and management (1150-1250 words), and the final exam (about 750-800 words). Students should use feedback from each writing assignment to improve the quality of the subsequent writing assignment.

Online Expeditions (0 points, however, see section on Course Workbook)

Students take on the role of practicing oceanographers in a series of virtual oceanographic research activities, called expeditions. By participating and completing these expeditions, students will meet Area R GE learning outcomes 1 and 3 – see list under “Course Goals and Student Learning Objectives” in this greensheet.

Electronic Discussion Boards (140 points – 14% of course grade)

At the end of expeditions 9 and 16, students will participate in required electronic discussions in Desire2Learn. Students will make an initial posting, approximately 325-375 words long (about 20-25 sentences) and reply to another student with a posting of approximately 50-75 words (about 4 to 5 sentences). The original posting and subsequent reply to at least one other student must be separate postings. Personal insight and accurate knowledge, gained from the associated reading assignments, and the quality of writing for communicating this knowledge to other students in the class are the important grading criteria for the initial posting in discussion. Discussions associated with expeditions 9 and 16 are worth 50 points each, 40 points will be assessed for content knowledge (what you say), including scientific accuracy support by verifiable evidence, and 10 points for writing quality (how you say it). The deadline for participating in required discussions, both the initial posting and reply to at least one other student, is same as the expedition in which it is assigned (see course schedule).
Grading criteria of the Expeditions 9 and 16 discussions will be based on the following rubric:

50-45 points = excellent work; well-written, insightful, and provides discussion beyond requirements of assignment

44-40 points = very good work; meets requirements of assignment by repeating what is provided in book; may have a few errors in understanding or writing quality, possibly a few awkward sentence constructions

39-35 points = Good to fair work; a number problems in writing style or comprehension of associated assigned reading, but meets criteria of assignment, may need better organization of thoughts, and overall work needs to improve

34-30 points = Poor Work, little or no analysis, poor quality writing; does not show insight from reading assignment; no reply.

30-0 points = not university-level work, does not follow requirements of assignment or use material from reading assignment as supporting evidence, poor writing quality

Not replying to another student in the Expeditions 9 and 16 discussions will result in a 5 point penalty.

The first student to post in a required discussion will receive automatic permission to post a late reply, since they should not need to wait for the postings of other students.

Initial postings of less than 325 words will receive a 5 to 15 point penalty, depending brevity of posting and exceeding 375 words in posting may result in a 5 point penalty.

The requirements for discussions in expeditions 21 and 22 are somewhat different, so students should consult the web site and appropriate section in course workbook for more details. By participating in these discussions students will meet GE Area R learning outcomes 1 and 2 – see list under “Course Goals and Student Learning Objectives" in this greensheet.

**Quiz and Essay on Marine Fish Stock Assessment (180 points – 18% of course grade)**

This is a two-part assignment consisting first of a short quiz to identify the key topics from the reading assignments to be included in the essay, worth 60 points. Students should review the “Marine Fisheries Assessment and Management Essay Instructions“ section of course workbook for additional information and study suggestions prior to beginning quiz. After students review instructor feedback from quiz, and review the “Marine Fisheries Essay Instructions“ section of course workbook for additional information, they will compose a three to four page essay (approximately 1150 to 1250 words), worth 120 points, on the methods and limits of science in assessing and managing marine fish stocks. The essay is to be submitted in Microsoft Word format (.doc) to Marine Fish Stock Assessment Essay section in DropBox of Desire2Learn, where it then will be automatically reviewed for originality in turnitin.com. Students must complete this assignment on their own and shall NOT copy material from any publication, including web sites,
even if enclosed in quotation marks. One objective of the assignments is to assess the quality of student writing and not the ability to use numerous quotations. By successfully completing this assignment, students meet GE Area R learning outcome 1 – see list under “Course Goals and Student Learning Objectives” in this greensheet.

Field Study on the San Francisco Bay

Students have a great time on this trip! Students will participate as scientists on a 4 hour-long voyage on the San Francisco Bay on the R/V Robert G. Brownlee with the Marine Science Institute in Redwood City. This is a “hands on” activity in formulating hypotheses, acquiring data to test these hypotheses, and analyzing data aboard the research vessel. Date and time of voyage is given in course schedule. By successfully completing this activity, students will meet GE Area R learning outcomes 1, 2, and 3 – see list under “Course Goals and Student Learning Objectives” in this greensheet.)

Online Exams (240 points each - 48% of course grade)

Student will complete two “open book/open notes” online exams lasting approximately 90-100 minutes each. Students may take exam anytime within a 24-hour period, but must complete exam in one sitting (no logging out and back in). Exam #1 will cover the materials and associated reading assignments in Expeditions 5 through 12. Exam #2 covers the material and associated reading assignments in Expeditions 13 through 20. Exam review sheets and study suggestions are provided in the course workbook. All expeditions and answer keys, if provided, will be removed from the course web site at the beginning of the exam period.

Students must work alone during exam and use only their own work to answer the questions. Students may not use information from outside web sites, for example, Wikipedia, during exam or information from students in previous classes. Any violation of these instructions will result in a failing grade on exam (0 points) and considered a violation of the SJSU Policy on Academic Integrity.

Exams will consist of approximately 13-18 multiple choice questions as well as one or two essay questions that will examine the ability of students to integrate course work into the key learning outcomes in the Area R (Earth and Environment) Category of the SJSU Studies GE program. Since the essay questions may ask students to place the content of the course in the specific context a scientific research experience, students will meet GE Area R learning outcomes 1, 2, and 3 – see list under “Course Goals and Student Learning Objectives” in this greensheet.

Students may request a change in the date and time of exams for personal circumstances, such as other exams on same day, computer/internet access issues, work schedule conflict, family obligations, and personal illness. All such requests must be emailed or called in to instructor before the start of the exam period. Students who do not take exam within scheduled period and do not contact the instructor in advance of exam will be assessed a late penalty of 25 points for each 24-hour period after scheduled end of exam.
**Course Workbook (100 points – 10% of course grade)**

The completed expedition worksheets are turned in all at once as part of your course workbook after the final exam – they are *not* turned in each week.

Keeping a detailed record of observations in experiments or field projects is an important part of all scientific investigations, in order to replicate for results for experimental verification. Consequently, students are required to complete the expedition worksheets in the course workbook. Moreover, the worksheets provide an outline for taking notes on the most important material in each expedition and therefore constitute a study guide to prepare for quizzes, writing assignments and exams.

Students must answer **all of the questions** on each expedition worksheet (honest, but incorrect, attempts are *not* marked down). A deduction of 5 points will be assessed for each expedition that was not attempted in course workbook. More than two skipped questions in an expedition will result in a penalty deduction of 3 points on course workbook and more than 5 skipped questions will receive a 4 point deduction.

Every student must submit a workbook for review by the instructor. The workbook should be dropped through the mail slot in door of Duncan Hall 222 ("BAESI office") after final exam has been completed. Instructions for this assignment can be found at the beginning of course workbook. Students who do not submit course workbook by due date will receive an incomplete (I) grade in the class. A late penalty of 10 points will be assessed for each 24-hour period after due date and time. By successfully completing this compilation of research results from the virtual expeditions, students will meet GE Area R learning outcome 3 – see list under “Course Goals and Student Learning Objectives” in this greensheet.

**Final Exam (100 points – 10% of course grade)**

Students will begin working on the final exam by participating in the required discussions in Desire2Learn described in Expeditions 21 and 22. These discussions will help students focus on potential ideas to develop in more detail on final exam.

The final exam is open book and open notes, but during exam, students may not use any sites on the WWW other than the course web site. The final exam will consist of two essay questions, which in combination require about 800-900 words of writing. Students will apply a scientific approach to current scientific questions dealing with the ocean. Grading of exam will be based on writing quality (20 points), critical and creative thinking, and scientific knowledge of the topics covered in this class (80 points).

One objective of the assignment is to assess the quality of student writing (not the ability to use quotations). Consequently, students shall NOT copy material from any publication, including web sites, even if enclosed in quotation marks. The exam answers will be submitted, by the instructor, for an originality check at www.turnitin.com. By completing this assignment, students meet GE Area R learning outcomes 1 and 3 – see list under “Course Goals and Student Learning Objectives” in this greensheet.
Due Dates and Late Policy on All Graded Assignments

The due dates for all assignments can be found in Course Schedule section of this greensheet. It is the responsibility of each student to follow the course schedule. The following deductions will be assessed for all work submitted after the due dates given in course schedule:

- 0-6 hours late – 5% deduction of total points possible
- 6-24 hours after deadline – 10% deduction of total points possible
- 25-48 hours after deadline – 20% deduction of total points possible
- Late submissions will not accepted if more than 48 hours after deadline

Course Grade (1000 points)

The course grade will be based on a combination of written essays, online discussions and quizzes, two exams, a workbook of online work and a final exam with a combined total of 1000 points. Keep track of scores on required assignments to determine your grade at anytime during course.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Score (possible)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation in Required Desire2Learn Discussions (160 pts.)</td>
<td></td>
</tr>
<tr>
<td>Expedition 9 - Science from Pseudoscience</td>
<td>(50)</td>
</tr>
<tr>
<td>Expedition 16 - Iron Fertilization</td>
<td>(50)</td>
</tr>
<tr>
<td>Expedition 21 – Top Ten</td>
<td>(20)</td>
</tr>
<tr>
<td>Expedition 22 – Your Question or Hypothesis</td>
<td>(20)</td>
</tr>
<tr>
<td>Marine Fisheries Stock Assessment and Management Essay (160 pts.)</td>
<td></td>
</tr>
<tr>
<td>Quiz</td>
<td>(60)</td>
</tr>
<tr>
<td>Essay</td>
<td>(120)</td>
</tr>
<tr>
<td>Exam #1 (online)</td>
<td>(240)</td>
</tr>
<tr>
<td>Exam #2 (online)</td>
<td>(240)</td>
</tr>
<tr>
<td>Final - Exam (online)</td>
<td>(100)</td>
</tr>
<tr>
<td>Course Workbook</td>
<td>(100)</td>
</tr>
<tr>
<td><strong>Total Points at end of course</strong></td>
<td><strong>(1000)</strong></td>
</tr>
</tbody>
</table>
Letter grades are not assigned individual assignments, but can be estimated using the percentage of points awarded out of the total points possible and by applying the scale below.

100-92%  A  79.9-78%  C+  61.9-60%  D-
91.9-90%  A-  77.9-72%  C  Below 60%  F
90.9-88%  B+  71.9-70%  C-
87.9-82%  B  69.9-68%  D+
81.9-80%  B-  67.9-62%  D

The percentage scale above can also be used to determine course letter grade at anytime in the course by calculating the percentage of total points earned out of total points available on all graded assignment at that time.

At the end of the course, letter grades will be based on the following scale:

1000-915 = A  814-795 = B-  694-675 = D+
914-895 = A-  794-775 = C+  674-615 = D
894-875 = B+  774-715 = C  614-595 = D-
874-815 = B  714-695 = C-  594 or less = F

University Policies

Academic Integrity

Students should know that the University’s Academic Integrity Policy is available at http://www.sa.sjsu.edu/download/judicial_affairs/Academic_Integrity_Policy_S07-2.pdf. Your own commitment to learning, as evidenced by your enrollment at San Jose State University and the University’s integrity policy, require you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The website for Student Conduct and Ethical Development is available at http://www.sa.sjsu.edu/judicial_affairs/index.html.

“Word for Word” copying from articles or web sites, or using quotations, does not meet the Area R writing requirement and is therefore forbidden in this class. As in any university work, students can use ideas and concepts from web sites or hardcopy materials, if the source is properly cited. Instances of academic dishonesty will not be tolerated in this class. Cheating on exams or plagiarism (presenting the work of another as your own, such as using outside web sites for information during exam, or the use of another person’s ideas in writing assignments without giving proper credit) will result in a “0” grade, plus additional point penalties, generally negative point deductions of the magnitude of specific assignment (e.g. 100 pt. assignment, -100 point score on assignment) and sanctions by the University. For this class, all assignments, including electronic discussions, are to be completed by the individual student unless otherwise specified. Students who provide information about quizzes and exams, or material for writing assignments, to other students will also be subject to the penalties described above. If you would like to include in your assignment any material you have submitted, or plan to submit for another class, please note that SJSU’s Academic Policy F06-1 requires approval of instructors. Quizzes and exams are assignments to be completed alone; evidence of collaborating with another person while taking the quiz or exam will result in an “F” in the class and submission of Academic Integrity Violation Report to the university.
Campus Policy in Compliance with the American Disabilities Act
If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the DRC (Disability Resource Center) to establish a record of their disability.

Desire2Learn Resources
For students experiencing technical problems with Desire2Learn (eg. unable to log in, need password re-set, etc.), please contact San Jose State University's Information Technology Support Services (ITSS) at 408-924-2377, or email at helpdesk@sjsu.edu ITSS is located on the first floor of the Academic Success Center in Clark Hall, if students wish to speak with someone in-person.

Learning Assistance Resource Center
The Learning Assistance Resource Center (LARC) is located in Room 600 in the Student Services Center. It is designed to assist students in the development of their full academic potential and to motivate them to become self-directed learners. The center provides support services, such as skills assessment, individual or group tutorials, subject advising, learning assistance, summer academic preparation and basic skills development. The LARC website is located at http://www.sjsu.edu/larc/.

SJSU Writing Center
The SJSU Writing Center is located in Room 126 in Clark Hall. It is staffed by professional instructors and upper-division or graduate-level writing specialists from each of the seven SJSU colleges. These specialists have met a rigorous GPA requirement, and they are well trained to assist all students at all levels within all disciplines to become better writers. The Writing Center website is located at http://www.sjsu.edu/writingcenter/about/staff/.

Course Schedule
The course schedule is subject to change with fair notice through messages in Desire2Learn Mail or posting on course website.

Expeditions will go online each Tuesday at Noon and need to be completed by the due date listed in course schedule on next page, usually the Friday at 11:00 AM of the week that the expedition is assigned or Tuesday at 11:00 AM of the following week. However, this schedule varies, so please consult schedule on next page.
<table>
<thead>
<tr>
<th>Week</th>
<th>Expedition Topics, Assignments, Readings, and Due Dates/Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Expedition #1</strong> An Educated Person and the Oceans; Due Tues. 1/31 by 11 AM</td>
</tr>
</tbody>
</table>
| 2    | **Expedition #2** Declining Marine Fisheries; Due Fri. 2/3 by 11 AM  
**Expedition #3** Fisheries Science; Due Tues. 2/7 by 10 AM |
| 3    | **Expedition #4** Fisheries Management – Due Fri. 2/10 by 11 AM  
**Quiz – Available Fri. Feb. 10 at Noon to Sat. Feb. 11 at Noon** |
| 4    | **Expedition #5** Mapping the Bay; Due Fri. 2/17 by 11 AM  
**Expedition #6** Map of the World; Due Tues. 2/21 by 11 AM |
| 5    | **Expedition #7** Commotion Beneath the Ocean; Due Fri. 2/24 by 11 AM  
**Essay - Due in Desire2Learn Dropbox by Wed. Feb. 22 by 1 PM**  
**Expedition #8** Boundaries Beneath the Sea; Due Tues. 2/28 by 11 AM |
| 6    | **Expedition #9** The Seafloor at Birth (Required Discussion #1); Due Tues. 3/6 by 11 AM  
**Field Study – Bay Discovery Voyage – Sat. March 3 from 7:40 AM to Noon** |
| 7    | **Expedition #10** Whole Lotta Shakin’ Goin’ On - Due Tues. 3/13 by 11 AM |
| 8    | **Expedition #11** Tsunami; Due Fri. 3/16 by 11 AM  
**Expedition #12** Dive and Discover Expedition; Due Tues. 3/20 by 11 AM |
| 9    | **Exam #1 – Available Wed. March 21 from Noon to Thurs. March 22 at Noon**  
**Expedition #13** The Briny Deep; Due Tues. 3/27 by 11 AM |
| 10   | **Expedition #14** Supporting the Marine Ecosystem; Due Fri. 4/6 by 11 AM  
**Expedition #15** Diving into the Canyon; Due Tues. 4/10 by 11 AM |
| 11   | **Expedition #16** Greening of the Ocean (Required Discussion #2); Due Fri. 4/13 by 11 AM  
**Expedition #17** Global Circulation; Due Tues. 4/17 by 11 AM |
| 12   | **Expedition #18** Tracking Drifter Buoy; Due Fri. 4/20 by 11 AM  
**Expedition #19** Ocean – The Climate Engine; Due Tues. 4/24 by 11 AM |
| 13   | **Expedition #20** Where the Water Goes; Due Fri. 4/27 by 11 AM |
| 14   | **Exam #2 – Available from Monday April 30 at Noon until Tuesday May 1 at Noon**  
**Expedition #21** The Final – Top Ten (Required Discussion #3) - Due Fri. 5/4 by 11 AM |
| 15   | **Expedition #22** The Final - The Question (Required Discussion #4) - Due Fri. 5/11 by 11 AM |
| 16   | **Tuesday, May 15** is the last day of instruction in this semester  
**Final Exam: Available Fri. May 18 at 5:15 PM to Mon. May 21 at 10 AM**  
**All Experiments will Go Offline on Wed. May 23 at 9 AM** |

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**Course Workbook is to be Placed through Door Drop Slot at Duncan Hall 222 On or Before Wed. May 23 by 5:00 PM**

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**Course grades will be posted on Desire2Learn on Wed. May 30 at 3 PM**
Geology 105 - General Oceanography – Upper Division Area R General Education

General oceanography is an online course that focuses on the scientific examination of the impact of the oceans on global society and human impacts on the oceans through web-based exercises, online discussions, and field studies of local shoreline habitats. The subject matter of the course falls under five themes: (1) marine fish stock assessment and management, (2) marine tectonics and geohazards, (3) marine ecosystems (surface water, mid-water and hydrothermal vents), (4) ocean circulation and climate change, and (5) the methods of contemporary ocean research. These themes are used to address the required student learning outcomes of the Earth and Environment category (Area R) in SJSU, which are: (1) students learn to appreciate the methods and limitations of scientific investigations of the global ocean, (2) distinguish between science and pseudo-science; and (3) apply the methods of science to answer questions about the earth and environment.

In addition to the Area R learning outcomes, students increase their understanding of the connection between the ocean and global society, the ocean ecosystem and its life forms, the interactions between the ocean and climate, and oceanography as a global science of special interest to diverse societies of the Pacific Rim, including the multicultural population of California.

To achieve the learning outcomes, stated above, students play an active role in their learning through the timely completion of online, self-paced virtual expeditions in which students take on the role of a research oceanographer. The course website has been recognized at the university, within the California State University System and nationally for the high quality, inquiry-based materials delivered through its website (http://oceansjsu.com). Students engage their peers in problem-based and issue-oriented electronic discussions following five of the expeditions. A four hour-long boat expedition to sample the ecosystem of the San Francisco Bay is scheduled for one Saturday during the course.

Student learning is assessed through the completion of worksheets that accompany online expeditions, forming a well-organized journal of their research during the course, a combined quiz/essay assignment on the methods of fish stock assessment and management, an online discussion on distinguishing between science and pseudoscience, which typically follows the half-day research voyage on the San Francisco Bay, two mid-term exams, an online discussion on iron fertilization, two online discussions on designing a research project to address a prominent question, of their own choosing, dealing with the oceans, and a final exam in which students present an oceanographic research project of their own design dealing with the question or hypothesis developed in the preceding online discussions.
As mentioned previously, General Oceanography is designed to meet three required student learning outcomes (SLO), each discussed below.

**SLO 1: Students will be able to demonstrate an understanding of the methods and limits of scientific investigation.**

Students complete a ten question quiz to identify some of the most common methods of marine fish stock assessment and management, followed by a 1100-1300 word-long essay in which they analyze these methods, citing the scientific basis, strengths and limitations of four assessment methods: virtual population analysis, research surveying, catch per unit effort, and application of chaos theory. Next students discuss how these assessment methods serve as input into several stock management methods, both traditional and contemporary (individual transferable quotas, catch shares and ecosystem management). Instructions for this assignment can be found at http://oceansjsu.com/105d/essay.html

A grade of C or higher (72% and above) is the threshold score for achieving this outcome.

**Results:** 152 out of 173 students, approximately 89% of the students, enrolled in the 2009-2010 academic year achieved this outcome. Going into more detail, 30% of the students achieved this outcome with excellent work, another 40% produced very good work, and 19% did satisfactory work in achieving this outcome.

The main reasons for not achieving this outcome included the fact that some students did not buy the textbook or complete the required reading assignments that provide a significant portion of the background information for this assignment or did not follow the assignment instructions in preparing the essay, often resulting in a meandering discussion, which drifted away from the objectives of the assignment (the methods and limits of scientific investigation).

Another common problem involves communicating their knowledge in clear, concise writing and a lack of insight into the limitations of scientific investigation. In some cases, the work of these students was rushed, poorly composed, completed at the last minute to meet the due date, and did not go through a careful proofreading or editing.
SLO#2: a student should be able to distinguish science from pseudoscience

Students participate in several scientific experiments during a 4-hour voyage on the San Francisco Bay in collaboration with the Marine Science Institute (information about the voyage at http://oceansjsu.com/105d/field/sf_bay.html). After a brief introduction to the day's activities, the class is divided into three research teams, which over the next three hours rotate between stations to collect samples for subsequent analyses of the fish populations, water properties and sediments of the bay floor. At the end of the voyage, the student research teams come together in a plenary session in the shipboard laboratory during which each team reflects on their research of that day to compile a list of the methods of science. Each group then contributes a distinguishing characteristic of the methods of science to a class-wide list of the laboratory whiteboard. Once back onshore, students research the distinguishing characteristics of science and pseudoscience, over the following week, and then share a synthesis of their learning in small groups in a 300-350 word-long electronic discussion and reply thoughtfully to the postings of other students on this subject. Instructions for this assignment can be found at: http://oceansjsu.com/105d/exped_birth/16.html.

A grade of C or higher (72% and above) is the threshold score for achieving this outcome.

Results: 147 out of 149 students or 98.7% of those who passed the course in the 2010-2011 academic year achieved SLO #2; two students did not achieve the outcome, one by compiling a sloppy synthesis in haste, and the other by not completing the assignment.

Key to the successful achievement of this SLO is the participation of students, as research oceanographers, in the acquisition and analysis of samples collected during the voyage on the San Francisco Bay. Moreover, students were able to continue their research online, over the following week, and then share their learning in a collaborative discussion with their peers. Students are able to identify common threads in the discussion and highlight insightful contributions from their peers.
SLO#3: students apply a scientific approach to answer questions about the earth and environment.

Over the last two weeks in the class, students discuss, with their peers, the ten most important topics or questions about the ocean that they would study as a professional research oceanographer. After reviewing and commenting on each other's ideas, each student then uses this knowledge to formulate a clear and well-defined question or hypothesis about the oceans that can be addressed by a scientific study of their own design. The proposed question or hypothesis is then used as a topic sentence in a 75-100 word-long problem statement that is shared with the class. Students then design a research project that is capable of generating scientific knowledge to address their proposed question or test their hypothesis. The students describe the research project in a well-written, coherent research grant proposal spread across two essay-style questions on the final exam, each requiring between 400-500 words in writing.

A grade of C or higher (72% and above) is the threshold score for achieving this outcome.

Results: 140 out of 149 students or 94% of those who passed the course in the 2010-2011 academic year achieved SLO #3.

The key attributes contributing to the successful achievement of this SLO is allowing students to pursue own question or hypothesis to study, working with their peers in small groups to present and modify these ideas, and advice and feedback provided by the instructor at critical junctures of hypothesis formulation and project design. Throughout the class, students participate in course assignments in the role of a research oceanographer through a series of virtual oceanographic expeditions. Consequently, students are well-prepared to identify topics to study and the design of a research project. Moreover, students were able to continue their research online, over the following week, and then share their learning in a collaborative discussion with their peers. Students are able to identify common threads in the discussion and highlight insightful contributions from their peers.
General Education Assessment Schedule

Area R: EARTH & ENVIRONMENT

Course Prefix and Number: **GEOL 105**  
Course Title: **General Oceanography**

Course Coordinator: **Don Reed**  
E-mail: **donald.reed@sjsu.edu**

Submission Date: **October 26, 2009**  
College: **Science**

**Instructions:** Each GE assessment schedule must indicate the plan for assessing all SLOs during the program planning cycle. Departments may assess any combinations of SLOs in a given year, but they must assess all GE area SLOs in a program review cycle. Some assessment of the course is required each academic year.

<table>
<thead>
<tr>
<th>GE Student Learning Objective</th>
<th>When will this SLO be assessed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLO 1: Students can demonstrate an understanding of the methods and limits of scientific investigation.</td>
<td>2009-2010</td>
</tr>
<tr>
<td>SLO 2: Students can distinguish science from pseudo-science.</td>
<td>2010-2011</td>
</tr>
<tr>
<td>SLO 3: Students can apply a scientific approach to answer questions about the earth and environment.</td>
<td>2011-2012</td>
</tr>
</tbody>
</table>
General Education Annual Course Assessment Form

Course Number/Title: GEOL 105 -- General Oceanography
GE Area: R Results reported for AY: 2009-2010
# of sections: 6 # of instructors: 1
Course Coordinator: Donald Reed E-mail: dreed@sjsu.edu
Department Chair: Richard Sedlock College: Science

Instructions: Each year, the department will prepare a brief (two page maximum) report that documents the assessment of the course during the year. This report will be electronically submitted, by the department chair, to the Office of Undergraduate Studies, with an electronic copy to the home college by September 1 of the following academic year.

Part 1
To be completed by the course coordinator:

(1) What SLO(s) were assessed for the course during the AY?

SLO 1: Students will be able to demonstrate an understanding of the methods and limits of scientific investigation.

(2) What were the results of the assessment of this course? What were the lessons learned from the assessment?

Students completed a 1300-word essay on the scientific methods of marine fish stock assessment, citing strengths and limitations of four methods: virtual population analysis, research surveying, catch per unit effort, and application of chaos theory. Instructions for this assignment can be found at http://oceanssjsu.com/105d/essay.html

A grade of C or higher (72% and above) is the threshold score for achieving this outcome.

152 out of 173 students, approximately 89% of the students, enrolled in the 2009-2010 academic year achieved this outcome. Students who did not meet this standard need to do a better job of comprehending reading assignments, asking questions about the uncertainties in their learning or the assignment, and communicating their learning in clear, concise writing that befits university-level work. The main reasons for not achieving this outcome included the fact that some students did not buy the textbook or complete the required reading assignments that provide a significant portion of the background information for this assignment or did not follow the assignment instructions in preparing the essay, often resulting in a meandering discussion, which drifted away from the objectives of the assignment (the methods and limits of scientific investigation). Another common problem involves communicating their knowledge in clear, concise writing and a lack of insight into the limitations of scientific investigation. In some cases, the work of these students was rushed, poorly composed, completed at the last minute to meet the due date, and not subjected to careful proofreading or editing. However, 30% of the students achieved this outcome with excellent work, another 40% produced very good work, and 19% did satisfactory work in achieving this outcome.
(3) What modifications to the course, or its assessment activities or schedule, are planned for the upcoming year? (If no modifications are planned, the course coordinator should indicate this.)

No specific modifications will be made other than continuing to stress to students: (1) the importance of the reading material in preparation for this assignment, (2) that GE courses require work, including reading comprehension and communication in writing, (3) the need to prepare in advance and ask questions to instructor or other students on the material, and (4) to review and understand the objectives and requirements of this assignment as outlined in the instructions.

**Part 2**

To be completed by the department chair (with input from course coordinator as appropriate):

(4) Are all sections of the course still aligned with the area Goals, Student Learning Objectives (SLOs), Content, Support, and Assessment? If they are not, what actions are planned?

Yes, all sections of GEOL 105 still meet the GE requirements for Area R.
General Education Annual Course Assessment Form

Course Number/Title: GEOL 105/General Oceanography  GE Area: R - Earth & Environment

Results reported for AY 2010-2011  # of sections 6  # of instructors 1

Course Coordinator: Donald Reed  E-mail: Donald.Reed@sjsu.edu

Department Chair: Robert Miller  College: Science

Instructions: Each year, the department will prepare a brief (two page maximum) report that documents the assessment of the course during the year. This report will be electronically submitted, by the department chair, to the Office of Undergraduate Studies, with an electronic copy to the home college by September 1 of the following academic year.

Part 1

To be completed by the course coordinator:

(1) What SLO(s) were assessed for the course during the AY?

SLO#2: a student should be able to distinguish science from pseudo-science

(2) What were the results of the assessment of this course? What were the lessons learned from the assessment?

Activity: Students conducted several scientific experiments during a 4-hour voyage on the San Francisco Bay in collaboration with the Marine Science Institute (information about the voyage at http://oceansjsu.com/105d/field/sf_bay.html). After a brief introduction to the day’s activities, the class is divided into three research teams, which over the next three hours rotate between stations to collect samples for subsequent analyses of the fish populations, water properties and sediments of the bay floor. At the end of the voyage, the student research teams come together in a plenary session in the shipboard laboratory during which each team reflects on their research of that day to compile a list of the methods of science. Each group then contributes a distinguishing characteristic of the methods of science to a class-wide list of the laboratory whiteboard. Once back onshore, students research the distinguishing characteristics of science and pseudoscience, over the following week, and then share a synthesis of their learning in small groups in a 300-350 word-long electronic discussion in Desire2Learn and reply thoughtfully to the postings of other students on this subject. Instructions for this assignment can be found at: http://oceansjsu.com/105d/exped_birth/16.html.

A grade of C or higher (72% and above) is the threshold score for achieving this outcome.

147 out of 149 students, or 98.7% of those who passed the course in the 2010-2011 academic year, achieved SLO #2. Two students did not achieve the outcome, one by compiling a sloppy synthesis in haste, and the other by not completing the assignment.

Key to the successful achievement of this SLO is the participation of students, as research oceanographers, in the acquisition and analysis of samples collected during the voyage on the San
Francisco Bay. Moreover, students were able to continue their research online, over the following week, and then share their learning in a collaborative discussion with their peers. Students are able to identify common threads in the discussion and highlight insightful contributions from their peers.

(3) What modifications to the course, or its assessment activities or schedule, are planned for the upcoming year? (If no modifications are planned, the course coordinator should indicate this.)

No modifications planned at this time.

Part 2

To be completed by the department chair (with input from course coordinator as appropriate):

(4) Are all sections of the course still aligned with the area Goals, Student Learning Objectives (SLOs), Content, Support, and Assessment? If they are not, what actions are planned?

Yes, all sections of Geology 103 still meet the GE requirements for Area R.
PREHISTORIC LIFE

Course: The main goal of this course is to review the history of life and to understand its development in terms of the changing geologic landscape, organic evolution, and episodic extinctions. You will learn to understand and appreciate the interrelationship of science and human beings to each other.

Learning Objectives: Upon successful completion of this course, you will be able to:
 a. understand the methods used to measure geologic time;
 b. understand how the fossil record is studied;
 c. appreciate the impact that knowledge of the fossil record has had on evolutionary theory;
 d. demonstrate an understanding of the methods and limits of scientific investigation;
 e. distinguish science from pseudo-science; and
 f. apply a scientific approach to answer questions about the Earth and environment.

Prerequisites: Passage of the Writing Skills Test (WST)
 100W is a prerequisite or co-requisite
 Upper division standing (60 units)
 Completion of Core General Education

Required Text: Wicander and Monroe, Historical geology (sixth edition)

Class: MW 9:00-10:15  DH 208; attendance is strongly encouraged

Office: DH 202, Phone: 924-5014, E-mail: David.Andersen@sjsu.edu

Office Hours: MTWTh 10:30-11:20, or by appointment

Field Trip: Saturday 18 February

Exams: Wednesday 29 February
 Wednesday 11 April
 Monday 21 May

Grading: Assignments (10) 20 percent
 Midterm #1 25 percent
 Midterm #2 25 percent
 Final Exam 30 percent

Assignments: There will be an assignment nearly every week (for about fifteen weeks), and you can receive credit for up to ten of these. Most assignments will be short questions intended to stimulate thought and discussion. Answers will be due at the beginning of the class following the day the assignment is made.
Meeting the SJSU learning objectives: Course activities and assignments address the GE Area R student learning objectives in the following ways:

In order to demonstrate an understanding of the methods and limits of scientific investigation (Learning Objective d), you will describe how the remains of ancient life can be preserved, explain how the geologic age of a fossil can be determined and evaluate the accuracy of such an age, and critically evaluate the various theories for several mass extinction events, including the extinction of the dinosaurs.

In order to distinguish science from pseudo-science (Learning Objective e), you will compare the theory of organic evolution with creationism.

In order to apply a scientific approach to answer questions about the earth and environment (Learning Objective f), you will critically evaluate different theories concerning the origin of the Earth and the origin of life on Earth, describe changes that have occurred in life through time, and explore the evidence related to the nature and distribution of fossil humans and the significance of these fossils for understanding modern humans.

Writing: Written assignments will include both in-class and out-of-class writing (General Education guidelines require a minimum of 3000 words during the semester). Writing will be assessed for clarity, grammar, and organization as well as content.

Most of the weekly homework assignments will involve writing outside of class. At least two of the written assignments will be based on reading and analysis of primary literature outside of the textbook, and at least one of these will involve library research to locate the appropriate literature. More details will be provided during the semester.

General Education: Courses to meet Areas R, S, and V of SJSU Studies must be taken from three different departments, or distinct academic units.

Academic Integrity: Your own commitment to learning, as evidenced by your enrollment at San José State University, and the University’s Academic Integrity Policy require you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Student Conduct and Ethical Development. The policy on academic integrity can be found at http://www.sjsu.edu/studentconduct/Students/.

Compliance with the Americans with Disabilities Act: If you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the Disability Resource Center (DRC) to establish a record of their disability. The DRC is in Administration 110, phone 924-6000.

PLEASE NOTE: The deadline to drop a class without a W is Monday 6 February. After that, drops will be processed only for serious and verifiable reasons. Unsatisfactory performance in course work is not a serious and compelling reason in itself for requesting permission to drop. (See calendar at http://www.sjsu.edu/provost/Academic_Calendars/ for details.)
<table>
<thead>
<tr>
<th>Date</th>
<th>Reading assignments to be completed before class (all in Wicander and Monroe, Historical geology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 25</td>
<td>Introduction</td>
</tr>
<tr>
<td>30</td>
<td>Rock cycle</td>
</tr>
<tr>
<td>Feb. 1</td>
<td>Sedimentary environments</td>
</tr>
<tr>
<td>6</td>
<td>Relative dating</td>
</tr>
<tr>
<td>8</td>
<td>Absolute dating</td>
</tr>
<tr>
<td>13</td>
<td>Radiometric dating</td>
</tr>
<tr>
<td>15</td>
<td>Origins of fossils</td>
</tr>
<tr>
<td>20</td>
<td>Fossils and the geologic time scale</td>
</tr>
<tr>
<td>22</td>
<td>Evolutionary theory and evidence</td>
</tr>
<tr>
<td>27</td>
<td>Classification and diversity of life</td>
</tr>
<tr>
<td>29</td>
<td><strong>Midterm exam</strong></td>
</tr>
<tr>
<td>Mar. 5</td>
<td>Origin of the solar system</td>
</tr>
<tr>
<td>7</td>
<td>Origin and structure of Earth</td>
</tr>
<tr>
<td>12</td>
<td>Plate tectonics</td>
</tr>
<tr>
<td>14</td>
<td>Plate tectonics</td>
</tr>
<tr>
<td>19</td>
<td>Origin of life</td>
</tr>
<tr>
<td>21</td>
<td>Precambrian and Paleozoic life</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Apr. 2</td>
<td>Paleozoic plants</td>
</tr>
<tr>
<td>4</td>
<td>Paleozoic vertebrates</td>
</tr>
<tr>
<td>9</td>
<td>Paleozoic extinction</td>
</tr>
<tr>
<td>11</td>
<td><strong>Midterm exam</strong></td>
</tr>
<tr>
<td>16</td>
<td>Mesozoic life</td>
</tr>
<tr>
<td>18</td>
<td>Mesozoic mammals and reptiles</td>
</tr>
<tr>
<td>23</td>
<td>Dinosaurs</td>
</tr>
<tr>
<td>25</td>
<td>Dinosaurs and birds</td>
</tr>
<tr>
<td>30</td>
<td>Mesozoic extinction</td>
</tr>
<tr>
<td>May 2</td>
<td>Cenozoic life</td>
</tr>
<tr>
<td>7</td>
<td>Cenozoic mammals</td>
</tr>
<tr>
<td>9</td>
<td>Primates</td>
</tr>
<tr>
<td>14</td>
<td>Early humans</td>
</tr>
<tr>
<td>21</td>
<td><strong>Final Exam</strong></td>
</tr>
</tbody>
</table>
General Education recertification information for Geology 107, Prehistoric Life
GE area R
Course Coordinator: David W. Andersen

1) Sample greensheet plus commentary

The sample greensheet is from the current Spring 2012 semester.

Our original GE certification proposal said that course activities and assignments would address the GE Area R student learning objectives in the following ways:

In order to demonstrate an understanding of the methods and limits of scientific investigation, students will describe how the remains of ancient life can be preserved, explain how the geologic age of a fossil can be determined and evaluate the accuracy of such an age, and critically evaluate the various theories for several mass extinction events, including the extinction of the dinosaurs.

In order to distinguish science from pseudo-science, students will compare the theory of organic evolution with creationism.

In order to apply a scientific approach to answer questions about the Earth and environment, students will critically evaluate different theories concerning the origin of the Earth and the origin of life on Earth, describe changes that have occurred in life through time, and explore the evidence related to the nature and distribution of fossil humans and the significance of these fossils for understanding modern humans.

The list above has appeared on every greensheet for every section since the GE certification request was approved. We think that the subject matter of Geology 107 provides an excellent vehicle for helping students to meet the GE student learning objectives for Area R.

2) Assessment report

a) Comprehensive evaluation

Through targeted writing assignments, short essays, and embedded questions in exams, students demonstrate that they have met the GE student learning objectives (SLO’s). For the writing assignments, a written rubric is provided, and the papers are evaluated for the quality of the writing as well as the content. We give students ample feedback about their writing and opportunities to improve it.

Students learn the methods of science by observing fossil samples, formulating hypotheses about the fossils, and describing ways to test these hypotheses. The limitations of science become apparent as students see that some features, such as anatomy, can be observed, but that other features, such as evidence for details of physiology, are not recorded well in fossils. These points serve as examples applicable to scientific study in general. Students address these questions by discussing, for example, whether or not the dinosaurs were warm-blooded.
Students learn that the theory of evolution has been discussed extensively in scientific and popular literature. Students also learn the significance of theories in scientific thinking and learn to contrast science with nonscientific ideas. In one assignment, students prepare scientific responses to several specific claims commonly made by creationists.

In addition, we address many ideas that still are controversial among scientists. Students study questions about such topics, including the origin of Earth, the origin of life, and the origin of modern humans. Students critically evaluate existing theories and propose alternative scientific theories to answer these questions.

Our assessment data show that most students in this course demonstrate that they have met the SLO's. In individual sections for an individual SLO, about 80 to 100 percent of students demonstrate that they have met the assessed SLO. Overall, more than 90 percent of students taking this course meet all three SLO's.

b) Changes made to improve student success

Although we have not felt it necessary to revise our original assessment plan, the individual assignments and activities used to assess student success have been improved many times based upon our assessment results. Course instructors meet at least once a semester to review the assessment results and discuss course modifications. After implementation, these modifications are reevaluated during the following semesters and further modified if necessary. Several of the assignments used to assess student learning have been improved and clarified to allow students to focus more specifically on the GE SLO.

Additional course changes have involved increasing or improving the ways in which students interact with each other. Our assessment results show that increasing the time or changing the focus of some group discussions improves student success on subsequent writing assignments, and we have made those adjustments. We also have expanded the use of collaborative activities other than discussions, and we have encouraged students to use these collaborations to develop working groups that extend beyond the initial activity. This peer support gives the stronger students a chance to improve their understanding by mentoring others, and it often completely eliminates course failure for the students with weaker study skills.

c) Future plans for course modifications

We currently do not see the need for major revision in the overall course content or in our assessment plan. We do, however, intend to continue to meet frequently to discuss ways to improve specific assignments and activities.
General Education Assessment Schedule

Area R: EARTH & ENVIRONMENT

Course Prefix and Number: GEOL 107  Course Title: Prehistoric Life
Course Coordinator: Dave Andersen  E-mail: andersen@geosun.sjsu.edu
Submission Date: October 26, 2009  College: Science

Instructions: Each GE assessment schedule must indicate the plan for assessing all SLOs during the program planning cycle. Departments may assess any combinations of SLOs in a given year, but they must assess all GE area SLOs in a program review cycle. Some assessment of the course is required each academic year.

<table>
<thead>
<tr>
<th>GE Student Learning Objective</th>
<th>When will this SLO be assessed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLO 1: Students can demonstrate an understanding of the methods and limits of scientific investigation.</td>
<td>2009-2010</td>
</tr>
<tr>
<td>SLO 2: Students can distinguish science from pseudo-science.</td>
<td>2010-2011</td>
</tr>
<tr>
<td>SLO 3: Students can apply a scientific approach to answer questions about the earth and environment.</td>
<td>2011-2012</td>
</tr>
</tbody>
</table>
General Education Annual Course Assessment Form

Course Number/Title: Geology 107 -- Prehistoric Life
GE Area: R
# of sections: 2
# of instructors: 1
Course Coordinator: David W. Andersen
E-mail: andersen@geosun.sjsu.edu
Department Chair: Richard L. Sedlock
College: Science

Instructions: Each year, the department will prepare a brief (two page maximum) report that documents the assessment of the course during the year. This report will be electronically submitted, by the department chair, to the Office of Undergraduate Studies, with an electronic copy to the home college by September 1 of the following academic year.

Part 1
To be completed by the course coordinator:

(1) What SLO(s) were assessed for the course during the AY?

SLO 1: students will demonstrate an understanding of the methods and limits of scientific investigation.

(2) What were the results of the assessment of this course? What were the lessons learned from the assessment?

Students completed a writing assignment and answered embedded test questions designed specifically to address this learning objective. Of 102 students assessed, 93 (91%) demonstrated that they successfully met this objective.

Before the writing assignment, students had participated in a group discussion to help them understand the methods and limits of science. In this discussion, students were asked to develop a scientific hypothesis to explain the orientation of cattle in a herd on windless, sunless days and then to plan a scientific investigation that would allow them to test their hypothesis. We think that this group discussion helped them to meet the learning objective.

(3) What modifications to the course, or its assessment activities or schedule, are planned for the upcoming year? (If no modifications are planned, the course coordinator should indicate this.)

We were pleased with the success of the in-class group discussion described above, and we plan to modify it to focus on explaining the function of the plates in Stegosaurus and then planning an investigation that would allow students to test this hypothesis. This course modification will help align this activity more clearly with the rest of the course content and link it more closely with the writing assignment.

Part 2
To be completed by the department chair (with input from course coordinator as appropriate):

(4) Are all sections of the course still aligned with the area Goals, Student Learning Objectives (SLOs), Content, Support, and Assessment? If they are not, what actions are planned?

Yes, all sections of GEOL 007 still are aligned with GE Area R guidelines.
General Education Annual Course Assessment Form

Course Number/Title  Geology 107  Prehistoric Life  GE Area: R

Results reported for AY: 2010 – 2011  # of sections: 9  # of instructors: 2

Course Coordinator: David Andersen  E-mail:  David.Andersen@sjsu.edu

Department Chair: Robert Miller  College: Science

Instructions: Each year, the department will prepare a brief (two page maximum) report that documents the assessment of the course during the year. This report will be electronically submitted, by the department chair, to the Office of Undergraduate Studies, with an electronic copy to the home college by September 1 of the following academic year.

Part 1

To be completed by the course coordinator:

(1) What SLO(s) were assessed for the course during the AY?

#SLO 2: students can distinguish science from pseudo-science

(2) What were the results of the assessment of this course? What were the lessons learned from the assessment?

Organic evolution is a major focus of this class, which examines the fossil record throughout Earth history. Students compared the theory of organic evolution with creationism. In one written assignment (approximately 5 pages) designed to assess this SLO, students constructed scientific responses to anti-evolution creationist claims.

The assignment was modified in the Spring 2011 semester to help students focus more specifically on distinguishing science from pseudo-science.

In Fall 2010, 189 students were assessed, and 175 (93%) received a passing grade for this assignment. In Spring 2011, 160 students were assessed, and 155 (97%) demonstrated that they had met this SLO with a passing grade on the written assignment.

(3) What modifications to the course, or its assessment activities or schedule, are planned for the upcoming year? (If no modifications are planned, the course coordinator should indicate this.)

In view of the success of the modification in Spring 2011, no modifications in assessment of this SLO are planned for the upcoming year.

Part 2

To be completed by the department chair (with input from course coordinator as appropriate):
(4) Are all sections of the course still aligned with the area Goals, Student Learning Objectives (SLOs), Content, Support, and Assessment? If they are not, what actions are planned?

All sections of Geology 107 (lecture and lab) still meet the GE requirements for Area R.
Appendix B-9

GE Re-certification, 2012

GEOL/ENVS 111

Geology and the Environment
College of Science/Department of Geology
GEOL/ENVS 111, Geology and the Environment
Sections 80 and 81, Spring 2012

Instructor: Dr. June A. Oberdorfer
Office Location: Duncan Hall 307
Telephone: 408-924-5026
Email: Use course website e-mail. Only if you can’t access the website, then use june.oberdorfer@sjsu.edu. I check e-mail multiple times per day (when near a computer) so that is the best way to contact me.
Office Hours: Wed: 0800-1200, except for the following dates: March 14 & 21, April 18
Class Days/Time: Online, no in-person meeting
Prerequisites: Students must have Upper Division standing (completed 60 units), have completed their Core General Education requirements, and have received a satisfactory score on the writing skills test (WST) in order to register for the class. 100W is a prerequisite or co-requisite. Courses taken to meet Areas R, S, and V of SJSU Studies must be taken from three different departments or other distinct academic units.
GE/SJSU Studies Category: Area R, Earth and the Environment

Course Description
“The effect of Earth processes on humans and their structures. Environmental problems related to earthquakes, landslides, minerals, energy, water and urban growth.” [SJSU Catalog]
This course is designed to introduce the students to aspects of their physical environment which can affect their lives and upon which they can an effect. These include:

- geologic hazards such as earthquakes and volcanic eruptions,
- uses and misuses of energy and water resources, and
- geologic processes that shape our world.

A well-informed citizen should be able to make wiser decisions on environmental issues.

GE/SJSU Studies Learning Outcomes
Satisfactory completion of this course satisfies the University’s Advanced General Education Requirement in Area R, Earth and the Environment. The requirement for a minimum of 3,000 words of writing is met through the nine Worksheet assignments for the
Exercises and the Group Field Trip Guide. The learning objectives for this GE area include.

1) *Demonstrate an understanding of the methods and limits of scientific investigation.* This objective is addressed in the Exercises and accompanying Worksheets (ex., examining evidence for plate tectonics, uncertainties in earthquake predictions).

2) *Distinguish science from pseudo-science.* This objective is full-filled through the Exercises and accompanying Worksheets (ex., claims about hydrogen as energy source are examine, arguments supporting or contradicting the Global Warming hypothesis are evaluated).

3) *Apply a scientific approach to answer questions about the earth and environment.* This objective is met through multiple activities in the Worksheets where you will collect information and draw conclusions about issues of concern in the physical environment.

**Required Texts/Readings**

**Textbook**


1) The textbook is available from the Spartan Bookstore and Robert’s Bookstore. This is a custom book including only the chapters we will be reading in this course. Having a custom book cuts the cost about in half. After you’ve had a chance to work with this book for awhile, let me know whether or not you think it’s a good idea to have a custom textbook, since this is the first time I’ve done it. The book’s ISBN number is 9781121372184.

2) The original, full-text version of the textbook is available through online booksellers and as a used book. Older editions of the book will not have the same information for many of the reading assignments and so are not recommended.

3) A digital version is also available from the publisher at a cost somewhat below the custom textbook. The electronic version of the custom textbook (not the full text) is available at [www.mcgrawhillcreate.com/shop](http://www.mcgrawhillcreate.com/shop). The e-book’s ISBN number is 9781121374751. While the electronic version will save you some money, I strongly recommend against purchasing that version since you will be spending a lot of time in front of a computer this semester. If you do use the e-book, please let me know what you think as this is also the first time I’ve had this option.

**Dropping and Adding**

Students are responsible for understanding the policies and procedures about add/drops, academic renewal, etc. Information on add/drops are available at [http://info.sjsu.edu/web-dbgen/narr/soc-fall/rec-298.html](http://info.sjsu.edu/web-dbgen/narr/soc-fall/rec-298.html). Information about late drop is available at [http://www.sjsu.edu/sac/advising/latedrops/policy/](http://www.sjsu.edu/sac/advising/latedrops/policy/). Students should be aware of the current deadlines and penalties for adding and dropping classes.
Assignments and Grading Policy

Online Readiness Exercise 20 points
Nine chapter exams (40 points each) 360 points
One cumulative Final Exam 60 points
Nine Worksheets (40 points each) 360 points
Group Field Trip Assignment (Site Selection, Work Plan, Guide) 200 points
Total 1,000 points

Final letter grades will be assigned according to the following percentages, although the grading may be curved downward in unusual circumstances.

98-100%: A+
87-89%: B+
77-79%: C+
67-69%: D+
<60%: F
93-97%: A
83-86%: B
73-76%: C
63-66%: D
90-92%: A-
80-82%: B-
70-72%: C-
60-62%: D-

No make-up exams will be given without prior consent of the instructor or a written medical excuse signed by a doctor. Make-up exams/quizzes must be taken in person during my office hours. Late assignments will be assessed a penalty: within first 24 hours, 25% of the earned grade will be deducted; within the second 24-hour period (i.e., 24 to 48 hours late), 50% of the earned grade will be deducted; and within the third 24-hour period (i.e., 48 to 72 hours), 75% of the earned grade will be deducted. Beyond 72 hours after the due date, no points will be given. If you do turn an assignment in late to my mailbox in the Department of Geology office, please be sure to have the office staff stamp the date and time on it. The only exceptions will be by prior consent of the instructor or with a written medical excuse signed by a doctor. To be fair to all students, these policies will be applied consistently. No Extra Credit is offered in this course, so be sure that you are aware of all assignments and complete them carefully and on time.

University Policies

Academic integrity

Students should know that the University’s Academic Integrity Policy is available at http://www.sa.sjsu.edu/download/judicial_affairs/Academic_Integrity_Policy_S07-2.pdf. Your own commitment to learning, as evidenced by your enrollment at San Jose State University and the University’s integrity policy, require you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The website for Student Conduct and Ethical Development is available at http://www.sa.sjsu.edu/judicial_affairs/index.html.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person’s ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include in your assignment any material you have submitted,
or plan to submit for another class, please note that SJSU’s Academic Policy F06-1 requires approval of instructors.

**Campus Policy in Compliance with the American Disabilities Act**

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the DRC (Disability Resource Center) to establish a record of their disability.

**Student Technology Resources**

Computer labs for student use are available in the Academic Success Center located on the 1st floor of Clark Hall and on the 2nd floor of the Student Union. Additional computer labs may be available in your department/college. Computers are also available in the Martin Luther King Library.

**Learning Assistance Resource Center**

The Learning Assistance Resource Center (LARC) is located in Room 600 in the Student Services Center. It is designed to assist students in the development of their full academic potential and to motivate them to become self-directed learners. The center provides support services, such as skills assessment, individual or group tutorials, subject advising, learning assistance, summer academic preparation and basic skills development. The LARC website is located at [http://www.sjsu.edu/larc/](http://www.sjsu.edu/larc/).

**SJSU Writing Center**

The SJSU Writing Center is located in Room 126 in Clark Hall. It is staffed by professional instructors and upper-division or graduate-level writing specialists from each of the seven SJSU colleges. Our writing specialists have met a rigorous GPA requirement, and they are well trained to assist all students at all levels within all disciplines to become better writers. The Writing Center website is located at [http://www.sjsu.edu/writingcenter/about/staff/](http://www.sjsu.edu/writingcenter/about/staff/).

**Peer Mentor Center**

The Peer Mentor Center is located on the 1st floor of Clark Hall in the Academic Success Center. The Peer Mentor Center is staffed with Peer Mentors who excel in helping students manage university life, tackling problems that range from academic challenges to interpersonal struggles. On the road to graduation, Peer Mentors are navigators, offering “roadside assistance” to peers who feel a bit lost or simply need help mapping out the locations of campus resources. Peer Mentor services are free and available on a drop–in basis, no reservation required. Website of Peer Mentor Center is located at [http://www.sjsu.edu/muse/peermentor/](http://www.sjsu.edu/muse/peermentor/).
GEOL/ENVS 111, Geology and the Environment, Spring 2012
Course Schedule

The due time is **before noon** on the date (usually a Wednesday) for Assignments (Online Readiness Exercise, Worksheets, and Group Field Trip Guide assignments). Exams are available **Wednesday noon to Thursday noon** (i.e., exams must be started, but don’t need to be finished, before Thursday noon).

**Dynamic Earth**

<table>
<thead>
<tr>
<th>Month</th>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>25</td>
<td>Begin Online Readiness Exercise</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Plate Tectonics, Read: pages 4-13 and Ch. 3 (page and chapter numbers are from the original textbook; these appear at the bottom of the custom text)</td>
</tr>
<tr>
<td>February</td>
<td>2</td>
<td>Online Readiness Exercise due (by noon)</td>
</tr>
<tr>
<td></td>
<td>8-9</td>
<td>Exam on Plate Tectonics available (based on Study Guide in Plate Tectonics section in the Content page) – see Quizzes tool in Desire2Learn</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Earthquakes, Read: Ch. 4</td>
</tr>
<tr>
<td></td>
<td>15-16</td>
<td>Exam on Earthquakes available</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Volcanoes, Read: Ch. 5</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Group Site Selection due, individually, by e-mail before noon</td>
</tr>
<tr>
<td></td>
<td>22-23</td>
<td>Exam on Volcanoes available</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>Worksheets due for first three Exercises by noon. (Dr. Oberdorfer’s mailbox in Dept. of Geology Office, DH 321, or postmarked the previous day, Feb. 28)</td>
</tr>
</tbody>
</table>

**Energy Resources**

<table>
<thead>
<tr>
<th>Month</th>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>March</td>
<td>1</td>
<td>Fossil Fuels, Read: Ch. 14, and pages 217-226</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Group Work Plan for Field Trip due, individually, to the Dropbox by noon</td>
</tr>
<tr>
<td></td>
<td>7-8</td>
<td>Exam on Fossil Fuels available</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Nuclear Energy, Read: 343-351 and 392-403</td>
</tr>
<tr>
<td></td>
<td>14-15</td>
<td>Exam on Nuclear Energy available</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Alternative Energy, Read: 351-368</td>
</tr>
<tr>
<td></td>
<td>21-22</td>
<td>Exam on Alternative Energy available</td>
</tr>
<tr>
<td>April</td>
<td>4</td>
<td>Worksheets for three middle Exercises due by noon (Dr. Oberdorfer’s mailbox in Dept. of Geology Office, DH 321, or postmarked the previous day, Apr. 3)</td>
</tr>
</tbody>
</table>

**Water Resources**

<table>
<thead>
<tr>
<th>Month</th>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>5</td>
<td>Streams and Flooding, Read: Ch. 6 and pages 406-427</td>
</tr>
<tr>
<td></td>
<td>11-12</td>
<td>Exam on Streams and Flooding available</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Groundwater, Read: Ch. 11 and pages 427-435</td>
</tr>
<tr>
<td></td>
<td>18-19</td>
<td>Exam on Groundwater available</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Waste Disposal, Read: pages 375-392</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Group Field Trip Site Guide due, individually, to the Dropbox by noon</td>
</tr>
<tr>
<td>May</td>
<td>2-3</td>
<td>Exam on Waste Disposal available</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Worksheets on last three Exercises due by noon (Dr. Oberdorfer’s mailbox in Dept. of Geology Office, DH 321, or postmarked the previous day, May 8)</td>
</tr>
<tr>
<td></td>
<td>16-17</td>
<td>Final Exam available (availability extended to 11:59 p.m. Thurs., May 17)</td>
</tr>
</tbody>
</table>
How the Course Accomplishes the GE SLOs for Area R

The Student Learning Objectives for this Area R include.

1) *Demonstrate an understanding of the methods and limits of scientific investigation.* This SLO is addressed in questions in the Study Guides for readings in the textbook and in many of the Exercises and accompanying Worksheets. Examples includes examining the steps that lead to the development of the Theory of Plate Tectonics or how the discoveries following the 1906 San Francisco Earthquake depended our understanding of earthquake mechanisms. The limits of scientific investigations are pointed out in some of the hypotheses and subsequent inadequacies of approaches to predicting earthquakes or in the variability of predictions about future impacts of Global Climate Change.

2) *Distinguish science from pseudo-science.* This objective is also full-filled through the Study Guides on readings in the textbook and through the Exercises and accompanying Worksheets. For instance, claims regarding hydrogen as an energy source (as opposed to an energy storage medium) are examined. The students are asked to discuss how they might know whether a prediction of an upcoming earthquake were valid or not.

3) *Apply a scientific approach to answer questions about the earth and environment.* This objective is met through multiple activities in the Worksheets, including video-taped field site visits (ex., canyon erosion in Alum Rock Park) and experiments (ex., spreading of a dye plume of “contaminated groundwater” in a sandbox model). The students are asked to hypothesize about the specific situation. They then collect information on the site or data on the experiment, are asked to analyze it quantitatively, and then draw conclusions from their analysis.
Assessment Report – GEOL/ENVS 111

Comprehensive Evaluation

This course is taught primarily online but also in the classroom. Both methods of delivery cover essentially the same material only in different formats. It focuses on those aspects of the physical environment which can have a strong impact on human beings (ex., earthquakes, volcanoes, floods, shaping of the landscape by plate tectonics) and upon which human beings can have a strong impact (ex., Global Climate Change, energy efficiency and renewability, contamination of water supplies, waste disposal). It examines the ways scientists learn about that environment (ex., how to monitor for volcanic activity, steps in forecasting earthquakes) and points to ways to reduce the negative impacts (ex., alternative energy sources, waste minimization). In this way the course addresses both GE goals of “knowledge of the scientific study of the physical universe” and of “the interrelationship of science and human beings”).

One of the goals of the course is to help the students become better informed about their physical environment so that they can make wiser decisions in both their personal and civic lives. After readings and exercises, they are asked to form opinions and write-about such topics as whether Global Climate Change has an anthropogenic source or what the appropriate U.S. policy should be towards nuclear energy and nuclear waste disposal. They are also asked to do personal energy use evaluations as well as exercises about waste recycling to get them to think about individual actions they can take that will affect the physical environment. These activities tie into the GE goal of increasing students’ civic awareness.

The writing requirement of 3,000 words for SJSU Studies is met through completion of nine Worksheets (average length ten pages) that the students complete on the individual content chapters in the course. The questions posed must be answered grammatically and in complete sentences. A rubric presenting the criteria for the evaluation of the writing is provided to the students. A majority of the Worksheets require the writing of one or two mini-essays (approximately 300 words each) synthesizing some of the main themes of that particle content chapter. These might be solving a problem (ex., what would you want to investigate if you were buying an older home along the Hayward fault in Fremont?) or arguing a point (provide a detailed discussion of what you feel is the appropriate approach to the disposal of high level radioactive waste). The Worksheets are evaluated on the quality of the writing as well as on the content. Additionally, there is a group project (approximately five students to a group) to produce a Field Trip Guide, including photos, maps, and about 1,200 words of text. Individual group members will contribute varying amounts of each and all members review the draft Guide before it is revised and ultimately submitted.

Changes Made to Improve Student Success

The course is constantly being updated (ex., inclusion of a discussion of the Japan earthquake/tsunami in both the earthquakes and the nuclear energy sections, discussion of the recent approval of the first new nuclear power plant in the U.S. in decades) to keep it current and relevant to what students are hearing about in the news media. Study Guides for readings in the textbook have been added; these questions help students focus critically on the major concepts (including those related to the SLOs) as they read the large amount of information. This has
helped improve student performance on exams. For the Group Project, sample work products (Work Plan, Field Trip Guide) have been added to give students an idea of how to format (ex., citations, references, layout) and what types of content materials (type of discussion in the text, photos, maps) should be included. The students are told that these are suggestions rather than prescriptions, but they have helped the students produce improved work.

**Plans for Course Modifications**

The primary instructor has begun researching Open Source textbooks and will probably select chapters from multiple textbooks to provide online in PDF format. This will reduce the cost to students and increase the likelihood of the students actually having their own copies of the readings. This change will require a revision of the nine Study Guides and a revision of the exam questions in the pool of questions. This will be completed over the next academic year for implementation the following time the course is taught.
General Education Annual Course Assessment Form

Course Number/Title: GEOL/ENVS 111 -- Geology and the Environment
GE Area: R Results reported for AY: 2009-10
# of sections: 2 # of instructors: 1
Course Coordinator: Dr. June A. Oberdorfer E-mail: june@geosun.sjsu.edu
Department Chair: Dr. Richard Sedlock College: Science

Instructions: Each year, the department will prepare a brief (two page maximum) report that documents the assessment of the course during the year. This report will be electronically submitted, by the department chair, to the Office of Undergraduate Studies, with an electronic copy to the home college by September 1 of the following academic year.

Part 1
To be completed by the course coordinator:

(1) What SLO(s) were assessed for the course during the AY?

SLO 1: Students can demonstrate an understanding of the methods and limits of scientific investigations.

(2) What were the results of the assessment of this course? What were the lessons learned from the assessment?

The following activities and techniques were used to present and assess student mastery of the Area R learning objective throughout semester and to reinforce the importance of the concept.

a. Footprint (map) exercise: a map with incomplete and potentially conflicting data (class exercise: 3-student team activity development and presentation of map analysis and possible interpretations, oral presentation and defense of conclusions before entire class). Exercise stresses the issues of arriving at appropriate conclusions with only limited or conflicting data presented in graphical form. This is a graded exercise with grade based on the logic of the analysis and effectiveness of the presentation.

b. Class demonstration with extensive student oral input on utilization of “Multiple Working Hypotheses:” development of multiple hypotheses to explain observations and of scientific methods to select among possibilities. This concept is an extension of the general concept of the scientific method. Students develop and defend multiple hypotheses to explain the Leaning Tower of Pisa. Evaluated through class room discussion and concepts tested on written examinations.

c. Lecture and class discussion of methods to determine the structure of the interior of the earth: study emphasizes the value of remote sensing (geophysics) and the limitations of such techniques in situations where the individual cannot personally contact or observe item under evaluation. Students use a “Slinky” to mimic the movement of seismic waves through the earth. Evaluations based on student responses to questions during discussion with inclusion of related questions on written examinations.

d. Daylong field trip along the Peninsula to the coastline of San Mateo County; analysis of geological features (San Andreas Fault, coastal features, Devil’s Slide, Bay Marshes). Direct observations in the field leading to multiple possible interpretations. Demonstrates
limitations of science to arrive at unique interpretations and the possible incompleteness of data developed simply by physical observations. Evaluations based on completion of written report with appropriate concepts tested on written examinations.

e. Classroom discussion of the change in accepted idea of how the earth’s crust and surface evolved: this discussion reports on and evaluates the changes in belief in the past 50 years from generally static geosynclines to the currently accepted concept of plate tectonics and continental drift. Discussion of why the original concept by Alfred Wegener was limited in acceptance because of lack of specific data about the process mechanics. Discussion of why, 25 years after his death, his ideas were validated as additional study (with technology that was unavailable to him) discovered the essential supporting evidence. Lecture and class discussion with appropriate concepts tested on written examinations.

Successful mastery of SRO 1 is demonstrated by successfully completing exercises and/or achieving C or better of the related portion of written examinations. Percent of class successful is show in the table:

<table>
<thead>
<tr>
<th>Activity 1</th>
<th>85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity 2</td>
<td>80%</td>
</tr>
<tr>
<td>Activity 3</td>
<td>85%</td>
</tr>
<tr>
<td>Activity 4</td>
<td>90%</td>
</tr>
<tr>
<td>Activity 5</td>
<td>90%</td>
</tr>
</tbody>
</table>

(3) What modifications to the course, or its assessment activities or schedule, are planned for the upcoming year? (If no modifications are planned, the course coordinator should indicate this.)

Only cosmetic changes are anticipated in techniques used to present and evaluate SLO 1 for Area R.

Part 2
To be completed by the department chair (with input from course coordinator as appropriate):

(4) Are all sections of the course still aligned with the area Goals, Student Learning Objectives (SLOs), Content, Support, and Assessment? If they are not, what actions are planned?

Yes, the sections of GEOL 111 still are aligned with the GE requirements for Area R.
**General Education Annual Course Assessment Form**

Course Number/Title: GEOL/ENVS 111, Environmental Geology  GE Area: R

Results reported for AY: 2010-2011  
# of sections: 5  
# of instructors: 2

Course Coordinator: June A. Oberdorfer  
E-mail: june.oberdorfer@sjsu.edu

Department Chair: Robert Miller  
College: Science

**Instructions:** Each year, the department will prepare a brief (two page maximum) report that documents the assessment of the course during the year. This report will be **electronically submitted**, by the department chair, to the Office of Undergraduate Studies, with an electronic copy to the home college by September 1 of the following academic year.

**Part 1**

To be completed by the course coordinator:

1. What SLO(s) were assessed for the course during the AY?
   
   SLO 2: Students can distinguish science from pseudo-science.

2. What were the results of the assessment of this course? What were the lessons learned from the assessment?

   Multiple approaches to evaluating this SLO were taken, including graded exercises, quizzes, and short essays on a variety of topics. Examples of these topics include: making scientifically-dubious earthquake predictions; whether or not “the Earth is young”; and whether Global Warming is human-induced or the result of natural processes. The results of these assessment tools indicate that this SLO is a difficult topic for students, with about half of the students mastering it well and about an additional quarter mastering it adequately (grade of C or above). Many students come with philosophical/religious/political preconceptions on these topics and are not always open to a science-based discussion.

3. What modifications to the course, or its assessment activities or schedule, are planned for the upcoming year? (If no modifications are planned, the course coordinator should indicate this.)

   The course will be modified to include additional discussion and examples of the topics; the assessments will be modified to reflect these additions.

**Part 2**

To be completed by the department chair (with input from course coordinator as appropriate):
(4) Are all sections of the course still aligned with the area Goals, Student Learning Objectives (SLOs), Content, Support, and Assessment? If they are not, what actions are planned?

Yes, all sections of Geology 111 still meet the GE requirements for Area R.
Appendix B-10

GE-Recertification, 2012

GEOL 112

Hazards and Risks of

Earthquakes and Volcanoes
# Hazards and Risks of Earthquakes and Volcanoes

**Geology 112: sections 1 and 2**

**Spring, 2012**

---

<table>
<thead>
<tr>
<th>Instructor:</th>
<th>Paula Jefferis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office Location:</td>
<td>Duncan Hall, 419</td>
</tr>
<tr>
<td>Telephone:</td>
<td>408-924-5016</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:paula.jefferis-nilsen@sjsu.edu">paula.jefferis-nilsen@sjsu.edu</a></td>
</tr>
<tr>
<td>Office Hours:</td>
<td>Monday, Wednesday: 9-10, 3:00-3:30; Tuesday/Thursday: 1:30-3:30; Thursday: 9:00-10:00; or by appointment</td>
</tr>
</tbody>
</table>
| Class Days/Time: | Monday/Wednesday:  
Section 1: 0900-1015  
Section 2: 1330-1445 |
| Classroom:    | Section 1: Duncan Hall 208  
Section 2: Duncan Hall 306 |
| Prerequisites: | Passage of WST, upper division standing |
| GE/SJSU Studies Category: | GE Area R |
Course Description
This course includes the geologic explanation to why and how earthquakes and volcanoes occur on Earth. Earthquakes and volcanic eruptions produce predictable types of hazards depending on different geological settings. Risks to people increase when populations are concentrated in areas where hazards may occur, when the possible hazards are not understood or exceed the expected magnitude. There are methods scientists and governments employ to reduce risks. However, economic status, social issues and hazard strength sometimes interfere with an overall reduction of risk. Geologic information presented in this class helps students understand the scientific explanation to why some areas are more prone to earthquake or volcanic hazards and why the affected populations should be concerned. Methods of preparedness are also discussed. This is especially important when living near many major faults in the San Francisco Bay Area that have the potential of producing significant size earthquakes.

Course Objectives:
Geology 112 addresses the student learning objectives for GE Guidelines under Area R courses in the following ways:

1. In order to demonstrate an understanding of the methods and limits of scientific investigation, the student will: examine and be able to explain the causes and distribution of earthquakes and volcanic eruptions, and the nature of and limitations of geoscientific study of these phenomena. The best example of this is the 2011 Japan earthquake and subsequent tsunami. There are many other examples that will be addressed in class illustrating this point.

2. In order to distinguish science from pseudo science, the student will: investigate a variety of postulated methods for predicting earthquakes and critically discuss the scientific basis, if any, of each.
   - The specific assignment that addresses these criteria is a short homework assignment where students are given several sources to research what methods are used to predict earthquakes. Each set of students is to produce a list and explanation to the method used and why or why not the method is based on scientific evaluation or pseudoscience methods.
3. In order to apply a scientific approach to questions about the Earth and environment, the student will: recognize hazards posed by volcanic eruptions and earthquakes.
   - There are two assignments that cover these criteria. The first assignment is related to volcanic hazards. The students are asked to evaluate the potential hazards and mitigation methods that are associated with the eruption of Mt. Rainier through a class exercise. The second assignment is completed in class using relief and topographic maps and guiding questions. Earthquake evaluation relating to Bay Area earthquakes involves an understanding of the topography, earth material, expected hazards, building design, building materials, and location of known faults.

**Course organization:**

The course is divided into three main sections:

1. Introduction: Why earthquakes tend to occur in particular geographic areas? This is explained through: the Earth’s formation: the Earth’s layers in terms of composition and state of matter; plate tectonics in terms of definition and consequences. The regional essay and oral reports helps students apply this information.

2. Volcanic activity in terms of: rock and landform classification, volcanic hazards, mitigations methods, prediction of an eruption and recovery after a volcanic eruption. The Mt. Rainier exercise summarizes some of this information.

3. Seismology or the study of earthquakes in terms of: the simplified mechanics of earthquakes, resulting hazards, earthquake forecasts. Mitigation methods used to reduce risk associated with earthquakes such as legislation, building codes, structural design and building materials. There are several assignments relating to these topics.

**Classroom Protocol**

Regular attendance, timely arrival, and attentive behavior in class are considered respectful. Cell phones should be off and therefore absolutely no text messaging in class. Laptop use is restricted to class notes or power point presentations. Students wishing to use the internet for other purposes should sit at the back of class.

In general, students reading appropriate chapters, participating in class with regular attendance score higher on exams.

**Dropping and Adding**

Last date to drop course without an entry on permanent record: February 6th
Last date to add course: February 13th
• Students are responsible for understanding the policies and procedures about add/drops, academic renewal, etc. Information is available at: [http://slisweb.sjsu.edu/enrollment/lateadd.htm](http://slisweb.sjsu.edu/enrollment/lateadd.htm). Students should be aware of the current deadlines and penalties for adding and dropping classes.

**Assignments and Grading Policy**

**Evaluation:**

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three exams @18</td>
<td>54 %</td>
</tr>
<tr>
<td>Term paper</td>
<td>15 %</td>
</tr>
<tr>
<td>Class exercises and homework</td>
<td>11 %</td>
</tr>
<tr>
<td>Emergency kit and plan</td>
<td>10 %</td>
</tr>
<tr>
<td>Field Trip</td>
<td>10 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100 %</strong></td>
</tr>
</tbody>
</table>

*Grades* are based on cumulative percentages of all graded assignments. Letter grades are assigned to approximately correlate with the following percentages:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-, A, A+</td>
<td>90-100</td>
</tr>
<tr>
<td>B-, B, B+</td>
<td>80-89</td>
</tr>
<tr>
<td>C-, C, C+</td>
<td>70-79</td>
</tr>
<tr>
<td>D-, D, D+</td>
<td>60-69</td>
</tr>
<tr>
<td>F</td>
<td>59 or below</td>
</tr>
</tbody>
</table>

*Exams* include the material covered by lecture, reading, movies and class activities. The format will include identifying locations on maps, an essay or short answer questions. About 85-90% of the exam consists of multiple choice questions. **There are no make-up exams without contact with instructor prior to the exam hour and proof of absence (emergency room slip, police report etc.).**

*Class exercises and homework (listed on page 10 of greensheet):* Various exercises completed in class emphasize a particular topic. Exam questions may be taken from the exercises. **No late exercises will be accepted!**

*Term paper: April 18th:* The 6-7 page paper written from student's choice of topic relating to earthquakes or volcanic eruptions. The focus should address the human impact in terms of how either the population or government responded, mitigation measures taken to reduce risk if another event were to occur, or any other aspect addressing hazard and risk. Directions are posted on the website. **The term paper should be submitted to turnitin.com before class on April 18th.**
Emergency kit and plan: due May 9th. A portable emergency kit should be assembled and presented in class accompanied by a written emergency plan. Students will discuss what is included and why as well as any interesting details regarding their emergency plan.

Field Trip: One off-campus field trip is required for this class. The field trip includes some moderate trail walking. The bus with students will depart from Duncan Hall at 0800, travel to Pinnacles National Monument, eat lunch, continue to Hollister, examine how man-made structures respond when constructed on top of a creeping section of an active fault, and return to San Jose State at 1530. The field trip date are: Section 1- April 14th; Section 2- April 21st.

Turnitin.com:
The term paper and seismic evaluation must be submitted into turnitin.com by the beginning of class time on the due date. No late copies will be accepted. In addition a hard copy of each writing assignment must be submitted within the first 10 minutes of class time on the due date. Include the turnitin receipt with the term paper hard copy.

Instructor will not read the hard copy if an electronic copy is not received on the turnitin.com website by the appropriate time.
To submit a paper to turnit.com:
Go to the home page:
www.turnitin.com
Follow the directions:
Click: create a new user profile on the homepage.
• Instructions are found on the home page of turnitin.com is an icon below the Log In location.
  ○ Click: training materials
  ○ Click: student user guide for detailed instructions
  ○ Submit text only: omit references and illustrations
  ○ Submit paper to the correct section!!

| Section 1 | Id: 4690912 | Password: earthquakes1  
  (case sensitive) |
|-----------|-------------|-------------------------|
| Section 2 | Id: 4690914 | Password: earthquakes2  
  (case sensitive) |
University Policies

Academic Integrity

The university maintains a strongly worded policy regarding academic integrity. Plagiarism (presenting someone else’s work as your own) and cheating will earn you an F and endanger your chances of passing the course, of retaining any academic or athletic scholarship you currently receive, and of remaining enrolled at this university. Read SJSU’s policy on Academic Integrity at http://www.sjsu.edu/studentconduct/Students/Student_Academic_Integrity_Process/.

University Policies

Academic integrity

Students should know that the University’s Academic Integrity Policy is available on http://www.sjsu.edu/studentconduct/docs/Academic_Integrity_Policy_S07-2.pdf. Your own commitment to learning, as evidenced by your enrollment at San Jose State University and the University’s integrity policy, require you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The website for Student Conduct and Ethical Development is available at http://www.sjsu.edu/studentconduct/.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person’s ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include in your assignment any material you have submitted, or plan to submit for another class, please note that SJSU’s Academic Policy F06-1 requires approval of instructors.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the DRC (Disability Resource Center) to establish a record of their disability. http://www.drc.sjsu.edu/aboutUs/contactus.htm

Learning Assistance Resource Center

The Learning Assistance Resource Center (LARC) is located in Room 600 in the Student Services Center. It is designed to assist students in the development of their full academic
potential and to motivate them to become self-directed learners. The center provides support services, such as skills assessment, individual or group tutorials, subject advising, learning assistance, summer academic preparation and basic skills development. The LARC website is located at http://www.sjsu.edu/larc/.

SJSU Writing Center

The SJSU Writing Center is located in Room 126 in Clark Hall. It is staffed by professional instructors and upper-division or graduate-level writing specialists from each of the seven SJSU colleges. Our writing specialists have met a rigorous GPA requirement, and they are well trained to assist all students at all levels within all disciplines to become better writers. The Writing Center website is located at http://www.sjsu.edu/writingcenter/.

Peer Mentor Center

The Peer Mentor Center is located on the 1st floor of Clark Hall in the Academic Success Center. The Peer Mentor Center is staffed with Peer Mentors who excel in helping students manage university life, tackling problems that range from academic challenges to interpersonal struggles. On the road to graduation, Peer Mentors are navigators, offering “roadside assistance” to peers who feel a bit lost or simply need help mapping out the locations of campus resources. Peer Mentor services are free and available on a drop-in basis, no reservation required. http://www.sjsu.edu/muse/peermentor/.
# Course Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics, Readings, Assignments, Deadlines</th>
<th>Chapter or pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/25</td>
<td>Introduction to course, expectations, class organization Plate tectonics: <a href="http://pubs.usgs.gov/gip/dynamic/dynamic.html">http://pubs.usgs.gov/gip/dynamic/dynamic.html</a></td>
<td>The Dynamic Earth: USGS publication 1</td>
</tr>
<tr>
<td>2</td>
<td>1/30-2/1</td>
<td>Energy, natural disasters, human fatalities, economic losses, risk and population Earth’s formation, introduction to plate tectonics Regions and partners assigned for essay and oral report project Introductory exercise due 2/1</td>
<td>Prologue and 1 2</td>
</tr>
<tr>
<td>3</td>
<td>2/6-8</td>
<td>The scientific method and plate boundaries World map and plate boundary worksheet due 2/8</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>2/13-15</td>
<td>Essay and oral reports due</td>
<td></td>
</tr>
</tbody>
</table>
| 5    | 2/20-22| Volcanoes:  
  • Volcanoes and tectonic setting  
  • Chemical composition of magmas  
  • Magma versus lava  
  • Viscosity, temperature, and water content  
  • The three Vs  
  • Volcanic explosivity index  
  • How a volcano erupts  
  • Volcanic landforms | Chapter 6 |
| 6    | 2/27   | Exam #1: Chapters prologue, 1, 2 and 6; handout on geographic locations and plate boundaries | Chapter 7 |
|      | 2/29   | Volcanic hazards: Pyroclastic flows, ashfall, gas emissions, lahars, lava flows  
  • Understand why and specific geographic locations to where | |
<p>| 7    | 3/5    | Class canceled | |</p>
<table>
<thead>
<tr>
<th>Date</th>
<th>Assignment/Activity</th>
<th>Chapter/Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Monitor and predicting volcanic hazards Mt. Pinatubo movie discussion</td>
<td>Chapter 7</td>
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<tr>
<td></td>
<td><strong>Class exercise: Mt. Rainier (3/14)</strong></td>
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<tr>
<td>9</td>
<td>Earthquakes, your prediction of what to expect and why?</td>
<td>Chapter 3</td>
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<tr>
<td></td>
<td>• Faults and factors that produce earthquakes</td>
<td></td>
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<tr>
<td></td>
<td>• Classification and associated landforms</td>
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<td></td>
<td>• Seismicity: earthquake waves and their behavior</td>
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<tr>
<td></td>
<td><strong>Geologic time exercise due: March 21&lt;sup&gt;st&lt;/sup&gt;</strong></td>
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<tr>
<td>10</td>
<td>Spring Break</td>
<td></td>
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<tr>
<td>11</td>
<td><strong>Class exercise: Locate an epicenter:</strong></td>
<td>3 (through page 74)</td>
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<tr>
<td></td>
<td>Measuring earthquakes</td>
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<td></td>
<td>Plate tectonics and earthquakes The San Andreas Fault: evolution; earthquakes; landforms; and location</td>
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<td></td>
<td><strong>Class exercise: San Andreas Fault</strong></td>
<td>Chapter 4 (99-109)</td>
</tr>
<tr>
<td>12</td>
<td><strong>Exam #2: volcanic hazards; Mt. Pinatubo movie and worksheet; volcanic prediction; Mt. Rainier exercise; three earthquake exercises; all earthquake information covered in class</strong></td>
<td>Handout</td>
</tr>
<tr>
<td></td>
<td><strong>Movie: When the Bay Area Quakes</strong></td>
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<tr>
<td></td>
<td>• Movie discussion</td>
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<td></td>
<td>• Finish map: earth material</td>
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<td></td>
<td>• Expected hazards and where?</td>
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<tr>
<td></td>
<td><strong>Class exercise: Bay Area Faults and hazards</strong></td>
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<tr>
<td>13</td>
<td>Tsunami</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>The Pacific Northwest, New Madrid seismic zone, southern California, and the Great Basin</td>
<td>Chapter 4. Chapter 5, and pages 74-80</td>
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<tr>
<td></td>
<td>Mexico City earthquake: 1985</td>
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<tr>
<td></td>
<td>• Building designs</td>
<td></td>
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<td></td>
<td>• Building materials</td>
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<td></td>
<td>• Earth material and structures</td>
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<td><strong>Term paper due April 18&lt;sup&gt;th&lt;/sup&gt;</strong></td>
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<tr>
<td>14</td>
<td>• Retrofitting techniques and seismically designed structures</td>
<td>5</td>
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<td></td>
<td>• California earthquakes and their influence on building codes and legislation</td>
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</table>
| 15 | 4/30-5/2 | • Long-term and short-term earthquake prediction  
|   |   | • Earthquake forecasts in California  
|   |   | Science versus pseudoscience discussion  |
| 16 | 5/7-9 | • The state of earthquake mitigation versus disaster  
|   |   | Emergency kit and plan discussion  |
| 17 | 5/14  
|   | 5/18 | Last day of instruction: field trip around campus  
|   |   | Section 1, exam #3: 0945-1200  |
| 18 | 5/21 | Section 2, exam #3: 1215-1430  |
## Assignments and Exams

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Due date</th>
<th>Percent of class</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam # 1</td>
<td>February 27&lt;sup&gt;th&lt;/sup&gt;</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Exam # 2</td>
<td>April 9&lt;sup&gt;th&lt;/sup&gt;</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>
| Exam # 3 Student must arrive within 15 minutes of starting time or admittance will be denied. | Section 1: 5/18; 0945-1200  
Section 2: 5/21; 1215-1430 | 18               |       |
| Regional essay and oral report                    | February 13<sup>th</sup> | 10               |       |
| Term paper                                       | April 18<sup>th</sup> | 15               |       |
| Pinnacles Field Trip                             | Section 1: April 14<sup>th</sup>  
Section 2: April 21<sup>st</sup> | 10               |       |
| Emergency kit and plan                           | May 9<sup>th</sup> | 10               |       |
| Introductory exercise                            | February 1<sup>st</sup> | 1                |       |
| World maps and plate boundaries                  | February 8<sup>th</sup> | 1                |       |
| Mt. Pinatubo and Mt. Rainier exercise            | March 14<sup>th</sup> | 1                |       |
| Geologic time                                    | March 21<sup>st</sup> | 2                |       |
| Locate an epicenter                              | April 2<sup>nd</sup> | 1                |       |
| The San Andreas Fault                            | April 4<sup>th</sup> | 1                |       |
| Bay Area faults, hazards, and earth material     | April 11<sup>th</sup> | 1                |       |
| Science versus pseudoscience exercise            | May 2<sup>nd</sup> | 2                |       |
Grading Rubric for all Written Work

All written assignments will be graded according to the rubric described below.

Content Criteria - 50% of assignment

Grade

A, A- Student objectives are stated. Answers the objectives with superior examples or evidence; unusual insights, creative and original analysis, reasoning and explanation; superior mastery of content, including logical flow of ideas.

B+, B Student objectives are stated. Good solid response that uses excellent supporting evidence or examples; excellent reasoning and explanations with a mastery of content with a logical flow of ideas.

C, C- Student objective is not clear. Good, solid response that meets minimum requirement of the assignment. Reasoning and explanations are adequate. Not enough depth.

D No student objective. Response is unclear and does not address the question; response fails to support assertions with data or examples; major flaws in reasoning; explanations are unclear; displays inadequate understanding of content.

F Response is missing or not submitted, or does not address the question.

Writing Criteria - 50% of assignment

Grade

A, A- Demonstrates superior correctness and sense of personal style. Logical flow of information is evident throughout writing. Interesting. Grammar and spelling are perfect.
<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>B+, B</td>
<td>Very effective organization of paragraphs and paper; interesting, varied sentences; good grammar (usage, punctuation, spelling); does not read like a first draft or book report.</td>
</tr>
<tr>
<td>B-, C+</td>
<td>Reasonably effective organization of paragraphs, numerous errors in grammar or spelling, reads like a first draft or book report.</td>
</tr>
<tr>
<td>C, C-</td>
<td>Structurally disorganized; paragraphs lack topic sentences or are not developed effectively; awkward sentence structure; poor grammar or spelling.</td>
</tr>
<tr>
<td>D</td>
<td>Similar to above but even more difficult to read.</td>
</tr>
<tr>
<td>F</td>
<td>Even more difficult to read, is missing or not submitted</td>
</tr>
</tbody>
</table>
Continuing Certification and Assessment Documents for Geology 112: Hazards and Risks of Earthquakes and Volcanoes (SJSU Studies Area R: Earth and Environment)

Geology 112: Hazards and Risks of Earthquakes and Volcanoes, continues to be one of our most consistently popular Area R offerings in the Department of Geology. Likely, this is because its emphasis on the spectacular natural phenomena of volcanic eruptions and earthquakes, and because the course content is directly relevant to many of the students taking the course.

(1) The sample greensheet reflects how the course is currently taught, with up to two pages of commentary explaining how the course accomplishes its GE SLOs.

The attached course greensheet gives some specific assignments in Geology 112 that are tailored to address the SLO’s, and these are elaborated on below.

SLO-1 (understanding the scientific method and limits of scientific investigation). The course subject matter provide a never-ending wealth of examples that can be used to address this goal. This is because earthquakes and volcanic eruptions are amenable to scientific investigation by the scientific method (e.g. earthquake epicenter location, the causes and distribution of volcanic belts and zones of seismicity related to active faults) but both are also are inherently complex phenomena that impose limits to our understanding (e.g. earthquake prediction). One particular assignment that addresses this SLO specifically tasks the students with using earthquake and volcano location data to delineate and locate major tectonic plate boundaries and has proved very. The students must actually produce a map and have to answer questions that assess their understanding of the causes and distribution of earthquakes based on their analysis of the data that is graded. Other assignments that ask students to critically and scientifically assess seismic risk address this SLO effectively (also related to SLO3). And the research paper(s) also address this SLO. Different instructors have different requirements with regard to the research paper(s)—in the most recent iteration of Geology 112 one instructor has a single 6-7 page research paper and the other has three shorter papers (1-3 pages, including a “jigsaw” paper that is written in class after a discussion and small group synthesis—see greensheet).

SLO 2 (distinguishing between science and pseudoscience) is a somewhat harder goal to accomplish but is primarily addressed through an assignment that focuses on earthquake prediction and some of the pseudoscientific methods that have been promulgated over the years to try to predict earthquakes. Earthquake prediction has long had its share of kooks and charlatans masquerading as “experts” who claim to be able to predict the time and location of earthquakes using various “methods” of investigation. The exercise is completed in groups with each group examining different hypothesized methods of prediction. After the groups presenting their part of the exercise, all students engage in discussion about the how these pseudoscientific methods differ from true scientific methods. In the course content and in exercises/assignments, there is also extensive coverage of the scientific basis for making probability estimates for large-magnitude
earthquakes on active faults in the Bay Area. Thus students also see how earth scientists characterize the potential for large earthquakes (in a long-term, probabilistic sense), which also emphasizes the limits of science in predicting earthquakes (SLO-1).

SLO 3 (applying a scientific approach to questions about the Earth and environment) is also addressed throughout in course content and several specific assignments. In one assignment, instructors have the students evaluate hazards and mitigation strategies for a large volcanic eruption through a class exercise. Students learn about and discuss in class the different types of volcanic hazards and their effects, and look at responses to different eruptions using examples from the past (Mt. St. Helens, Mt. Pinatubo). They then apply what they learn in the exercise to evaluate hazards and mitigations for a potential eruption of a major volcano (e.g. a potential eruption of Mt. Rainier on the outskirts of the Seattle-Tacoma area). The other instructor accomplishes this goal through a research paper asking students to infer the volcanic hazards and societal implications for residents of northwestern Washington state (near Mt. Rainier) from the earlier volcanic eruptions of Mt. St. Helens, Nevada del Ruiz, and Mt. Pinatubo. One of the current instructors has students do an exercise similar to the volcanic hazard exercise with geologic and active fault maps and seismic hazard maps for the Bay Area (also SLO-1). The other instructor has students write two short (2-page) papers where they must use these maps to evaluate the seismic hazards and asses the risks at either their current address or workplace, and then a second short paper on the seismic structural risk at that address using information about earthquake engineering and seismic retrofitting given during lecture.

(2) An assessment report (two page maximum) for that includes the following:

a. A comprehensive evaluation of the course that may include a focus on the GE Goals for its area or other course goals.

A variety of pedagogical tools continue to be used at address the specific student learning objectives for Area R. These include: course lecture content, homework assignments, in-class exercises/short papers, field trips, writing assignments (term papers), and exams as noted above. Different instructors may use slightly different assessment tools and/or assign different percentages on assignments for overall grade.

SLO-1: This learning objective is assessed throughout the class using exam questions, several in class exercises (e.g. plate boundaries exercise noted above) and a research paper(s). All students must complete the assignments and each assessment instrument is graded. With regard to the plate boundary exercise discussed in (a) above approximately 85-90% of students receive grades of C or better. Grades are comparable for other assignments that directly address this SLO. The research paper(s) is/are comparable in terms of their overall effectiveness as assessment tools for helping students achieve this SLO.
SLO-2: This SLO is assessed mainly through the assignment on earthquake prediction and also on related exam questions. In initially approaching this SLO, it is difficult for some students to make the distinction between science and pseudoscience because of the tendency to defer to “credentialed” authorities. However, the exercise and subsequent group discussions have proven to be very effective at achieving this SLO. Nearly all students (i.e. 100%) taking Geology 112 learn that successful earthquake prediction using scientific methods has not been achieved, despite widespread pseudoscientific claims to the contrary.

SLO-3: The in-class exercises, assignments, and papers discussed above effectively address this SLO, and the instructors state that all students come away with a much deeper understanding of volcanic and seismic risk, and how these risks are managed. They are also evaluated on their grasp of important concepts and facts via exam questions. For the earthquake hazard and structural risk assessment papers for home or workplace, mentioned above, 100% of students ultimately achieve a grade of B or higher. These papers are returned with detailed comments and are reworked and regraded to ensure that students have a firm understanding of the natural seismic hazards they face in the San Francisco Bay Area, the structural risks to which they are exposed by living and working here, and the specific mitigation strategies they may employ to lessen those risks.

b. Changes that the department has made to try to improve student success with respect to the GE SLOs.

The department has made no changes with respect to the SLOs as our evaluation indicates we continue to meet them. However, individual instructors modulate their courses to try to maintain and improve on our success in this course. It is worth noting that the occurrence of volcanic and earthquake-related events that inevitably happen during the course often provide “teachable moments” in regards to the SLOs that require applying a scientific approach to understanding how the Earth behaves—e.g. the eruption of Eyjafjallajökull in 2010 in Iceland and the Tōhoku earthquake in Japan in 2011, and their hazards (e.g. the tsunami and damage to Fukushima nuclear reactor), and society's response to these crises. Instructors can thus constantly refresh the content of Geology 112 with real world examples of volcanic and earthquake-related hazards and effects.

c. Future plans for course modifications, if applicable.

No modifications are planned at this time.
General Education Annual Course Assessment Form

Course Number/Title: GEOL 112 -- Haz Risks EQs Volc
GE Area: R                                      Results reported for AY: 09-10
# of sections: 7                                # of instructors: 1
Course Coordinator: Richard Sedlock            E-mail: richard.sedlock@sjsu.edu
Department Chair: Richard Sedlock               College: Science

Instructions: Each year, the department will prepare a brief (two page maximum) report that documents the assessment of the course during the year. This report will be electronically submitted, by the department chair, to the Office of Undergraduate Studies, with an electronic copy to the home college by September 1 of the following academic year.

Part 1
To be completed by the course coordinator:

(1) What SLO(s) were assessed for the course during the AY?

   SLO 1: Students can demonstrate an understanding of the methods and limits of scientific investigation.

(2) What were the results of the assessment of this course? What were the lessons learned from the assessment?

   The chief vehicle for assessing student outcomes of SLO #1 was in-class work and homework that focused on the distribution, causes, and precursors of earthquakes and volcanoes. In one project, students evaluated scientific investigations that were used to successfully predict the eruption of Mt. Pinatubo in the Philippines. The instructor evaluated written reports to determine that 85% of the students satisfactorily expressed an understanding of the methods and limits of these investigations.

   In a second project, students evaluated the publicly funded research on the San Andreas fault near Parkfield, California (where scientists have monitored fault activity for over 30 years, but still cannot predict earthquake activity). Based on class discussion and written reports, the instructor estimated that 85-90% of the students satisfactorily understood the methods and limits of these investigations.

(3) What modifications to the course, or its assessment activities or schedule, are planned for the upcoming year? (If no modifications are planned, the course coordinator should indicate this.)

   None are planned.

Part 2
To be completed by the department chair (with input from course coordinator as appropriate):

(4) Are all sections of the course still aligned with the area Goals, Student Learning Objectives (SLOs), Content, Support, and Assessment? If they are not, what actions are planned?

   Yes, the sections of GEOL 112 still are aligned with the GE requirements for Area R.