General Education Annual Course Assessment Form

Course Number/Title GEOL-001 General Geology  GE Area B1-B3

Results reported for AY 2017/2018  # of sections 5 lec; 13 lab  # of instructors 2 (lec); 8 (lab)

Course Coordinator: Ryan Portner  E-mail: ryan.portner@sjsu.edu

Department Chair: Jonathan 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 to <curriculum@sjsu.edu>, by the department chair, to the Office of Undergraduate Studies, with an electronic copy to the home college by October 1 of the following academic year.

Part 1

To be completed by the course coordinator:

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

   GELO 1: Students should be able to use the methods of science and knowledge derived from current scientific inquiry in life or physical science to question existing explanations.

   GELO 2: Students should be able to demonstrate ways in which science influences and is influenced by complex societies, including political and moral issues

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

   GELO 1: This learning objective was addressed in lecture during discussions on the following THREE topics and tested in class through inquiry, exam and canvas quizzes:

   (i) Understand the difference between a hypothesis and theory as demonstrated by the development of Plate Tectonic Theory: Students grappled with the hypothesis of Continental Drift and the current explanation for plate tectonics. Class discussion focused on understanding the difference between hypothesis and theory, evidence to support different models, and the reasons for acceptance of one over the other. In class, students were able to explain the difference between the different models and clearly understood why one was accepted and became theory while the others were dismissed. The Canvas quiz question that tested these concepts was answered correctly by 94% of students, demonstrating a clear understanding by the students.

   (ii) Confirm modern theory about the formation of Earth’s compositional layers: Prior to formal instruction on this topic, class discussion focused on possible processes that could have formed the Earth and its various layers (crust, mantle and core). In most classes, the students came up with accepted models on their own. Following more formal instruction about
accepted models, several Canvas quiz questions show students tended to score fairly well: between 65% and 97% of all students in each section answered correctly.

(iii) **Bing Bang Theory**: Class instruction and discussion focused on the formation of the Universe and its origin. Students learn about how the Big Bang Theory was developed, evidence to support it, and how it evolved from a hypothesis to the currently accepted scientific theory that explains the origin of the Universe. Canvas quiz questions that relate to this topic were correctly answered by 64-87% of students in the two sections.

GELO 2: This learning objective was clearly addressed through many lectures, take home assignments, quizzes and exams. FIVE main topics addressing the GELO2 theme were covered in the course including: the Big Bang theory, Earthquake Preparedness, Evolution/Fossils, Plate Tectonics, and Climate Change. All of these topics include elements of how science informs and is informed by societal, political and moral issues.

(i) **Big Bang Theory**: Class discussion focused on the idea of Young Earth Creationism and how it has put pressure on scientific understanding of the universe. A question in a quiz, “What is the Age of the Universe?” had a 100% response rate. Students scored moderately well with 77% of the students being correct. Although incorrect they showed that they were able to understand that the evidence of the Big Bang was conclusive.

(ii) **Plate Tectonic Theory**: Class instruction focused on the scientific process that incorporated multiple ideas to form the theory of plate tectonics. Students learned that the same technology that was created to fight both World War 2 and the Cold War also helped support a new blossoming scientific theory. The question was, “What two discoveries were made that helped support the idea that continents move over time?”. Student scored very well with 70% receiving full credit and only 10% receiving no credit.

(iii) **Fossils and Evolution**: This topic addressed how science has to confront societal (religious) ideas in the effort to explain the natural world. A quiz question, “Which of the following are pieces of evidence that support the theory of evolution?”, allowed assessment of this GELO2. More than 78% of all 30 responses were correct.

(iv) **Climate Change**: The false statement of “Only about 50% of climate scientists are convinced that the Earth’s temperature is warming and that human activities are the cause.” was detected by 25 of 29 students that responded. This idea was discussed in conjunction with the current discussion of Climate Change in our political environment. The vast majority of students were able to perceive this falsehood and ignore the political confusion.

(v) **Earthquake Preparedness**: Students were clearly exposed to the positive influence on society through informing communities about potential natural hazards that could affect their daily lives. A take home assignment on this topic included questions like: “Identify 4-5 potential hazards in your home or dorm room. What can you do to make your living area safer in the event of an earthquake?”. The average grade on this assignment was 89%.

(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.)

GELO 1: Exam and quiz statistics show that topics ii and iii above require some more instruction to help the students gain a thorough understanding. For example, topic GELO 1 (ii) and (iii) were
answered correctly by as little as 65% of the class. This will be adjusted next year in lecture and lab sections by reviewing these topics more carefully and adding more quiz questions to help determine if students have gained a better understanding. For example, future adjustment to the lab will teach the Doppler Effect and how it helps to support the Big Bang Theory.

GELO 2: In the future this course will continue to stress the importance of understanding how science exists within our society. Within the context of this GELO2 additional take home assignments for Climate Change will help better assess whether or not students understand it better after more thorough investigation of the topic during class instruction. A questionnaire, before instruction, dealing with what you know and how you know it, will help illuminate the intellectual growth with regard to this learning outcome.

Part 2

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

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

Other than the minor modifications noted above, all sections are still aligned with the GELO’s.

(5) If this course is in a GE Area with a stated enrollment limit (Areas A1, A2, A3, C2, D1, R, S, V, & Z), please indicate how oral presentations will be evaluated with larger sections (Area A1), or how practice and revisions in writing will be addressed with larger sections, particularly how students are receiving thorough feedback on the writing which accounts for the minimum word count in this GE category (Areas A2, A3, C2, D1, R, S, V, & Z) and, for the writing intensive courses (A2, A3, and Z), documentation that the students are meeting the GE GELOs for writing.