General Education Annual Course Assessment Form

Course Number/Title: ENGR 100w “Engineering Reports on Earth and Environment

GE Area(s): AREA Z and AREA R

Results reported for AY: Spring 2016/Fall 2015 # of sections: 24 # of instructors: 12

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Department Chair: Dr. Ahmed Hambaba, General Engineering

College: Engineering

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?

• AREA R GELO 3: Students will be able to apply a scientific approach to answer questions about the earth and environment. (Spring 2016)

• AREA Z GELO 2: Students shall be able to explain, analyze, develop, and criticize ideas effectively, including ideas encountered in multiple readings and expressed in different forms of discourse (Fall 2015)

• AREA Z GELO 1: Students shall be able to produce discipline-specific written work that demonstrates upper-division proficiency in: language use, grammar, clarity of expression (Spring 2016)

(2) Results for AREA R GELO 3

410 of the 464 students enrolled in Engineering 100w completed a quiz in class after viewing a guest speaker’s presentation on climate change (Dr. Cordero, 2-17-16). The presentation was one of ten weekly speakers scheduled in the 100w GreenTalk series. The quiz consisted of 10 questions: two fact-based short answer, two opinion-based short answer and six multiple choice questions. Forty-nine percent of the students viewed the GreenTalk via You Tube with Closed Captioning and the remaining students viewed the live guest speaker in the Engineering auditorium. Thirty percent of students viewed the GreenTalk on the same day they took the quiz, whereas 70 percent experienced a lag time between viewing and attending class where the quiz took place. Faculty were encouraged to use the quiz/results as a discussion tool. Coordinator review of answers demonstrated that 85% of students where able to “apply a scientific approach…”

Sample question: Can we scientifically test whether CO2 added to the atmosphere, causing the increase measured since 1960 is caused by fossil fuel burning?
348 students answered yes and could explain their answer effectively. These explanations included “the isotopic signature of the CO2” and “CO2 produced from fossil fuel burning has a distinct chemical marker,” “fossil fuels leave a carbon footprint that can be uniquely identified” and “1) fingerprinting methods and 2) atmospheric measurements.” 26 students (6%) answered no. 36 students (9%) answered “uncertain.” If students who answered “uncertain” are included, 15% did not meet the standard for this SLO.

**Lessons Learning AREA R GELO 3:**

During the faculty assessment meeting, faculty pointed out that “uncertain” answers can’t be considered “wrong” or failed from an understanding or outcomes perspective. This led to an engaging faculty discussion wherein faculty defined the term “scientific approach” and discussed the scientific principal of “uncertainty.” Faculty discussed whether or not “if students remain uncertain after Dr. Cordero’s thorough analysis of climate science, including radiative forcing and fingerprinting, does that mean they failed to “apply a scientific approach” given that “uncertainty” is itself a scientific principal? Faculty advised that the language in the questions needs to be carefully considered to avoid inaccurately skewing the data. Furthermore, faculty suggested to use the language “from the SLO itself in the question whenever possible.” A subsequent review of explanations written by students who answered “uncertain” showed that these students did indeed incorporate an opinion-based justification. The answers either misunderstood or lacked a scientific approach and therefore did fail to apply a scientific approach.

To improve AREA R GELO 3 outcomes, faculty proposed the following activities: 1) actively engaging students in discussions of key concepts during lab time; make clarifications; answer questions; explain ambiguity, 2) utilize small groups to locate factual information in textbook on the topic leading to informal presentations, 3) collaborative writing on the topic, 4) provide feedback on students’ written work that asks students to revise by locating and incorporating additional factual information to demonstrate improved clarity on the topic followed by a whole class review of excellent revisions, 5) review sections of the GreenTalk via You Tube during Q and A class discussion.

The majority of faculty agreed to participate in future GreenTalk Quizzes and suggested developing quizzes on the following topics: transportation, energy and climate. These quizzes could be distributed each semester to hold students accountable for the information in the guest speaker series (in addition to classroom writing/presentation assignments) and to facilitate discussion.

**Results for AREA Z GELO 1 and 2**

100% percent of students actively enrolled in Engineering 100w were assessed for Area Z at the end of the fall 2015 and spring 2016 semesters. The Exit Exam has been conducted for more than a decade in Engineering 100w and is assessed using a 12-point scale rubric. The average score was 8.06 in fall 2015, 8.19 in spring 2015 and 7.8 in summer 2015. In spring
2016 the Exit Exam average jumped to 9.08. In fall 2015, 9% of students scored above 10. In spring 2016, 37% scored above 10. There was a 28% increase in the number of exams earning an above-average score.

Exam data was collected through the same process each semester: distribution of a faculty-generated Exit Exam prompt during a proctored, timed, writing period in the COE computer labs. Internet access was disabled and students were not allowed any notes or aids during the examination period. Exams were then sent to an outside evaluator for blind scoring (no student or faculty identities are permitted on the prompt or submission). In lieu of names, students use their SJSU Account One ID numbers and section numbers on the exam. However, in spring 2016 coordinators distributed a standardized template for Exit Exam directions, including time and minimum/maximum length requirements. In fall 2016, coordinators will work with the faculty team to ensure students have standardized prompts across all sections.

<table>
<thead>
<tr>
<th>Score</th>
<th># of students Spring 2016</th>
<th># of students Fall 2015</th>
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<tr>
<td>Total</td>
<td>518</td>
<td>464</td>
</tr>
</tbody>
</table>

518 students were assessed for AREA Z SLO 2 in spring 2016
464 students were assessed for AREA Z SLO 1 in fall 2015

**What were the lessons learned from the assessment?**

Coordinators agreed that a standardized template for Exit Exam directions should be distributed to faculty to ensure fairness in scoring. A randomized sample of Exit Exams in fall 2015 revealed that there was some disparity in length requirements. During the fall 2015 semester, some faculty established the maximum length at 1.5 pages and others at two pages. Longer exams tended to receive higher scores. In spring 2016 a template for Exit Exam directions was distributed to all faculty that set the maximum length at two pages. This change may have contributed to the improved overall average score for spring 2016. However, the changes to the WST policy could also be contributing to this increase (students now must attain a 7 on the WST while historically students who score a 6 were allowed to enroll in 100w).

(3) **Modifications**

The GreenTalk series continues to be fully integrated across all sections of 100w. Because the Engineering 100w program has more than doubled in size in the last five years (from 11 sections in fall 2011 to 24 sections in fall 2016), the addition of more hybrid sections has helped to alleviate overcrowding in the Engineering Auditorium and COE computer labs. A hybrid section consists of one in-person and one online meeting weekly. Three faculty members will be teaching “hybrid” sections in fall 2016 wherein the GreenTalk may be viewed via YouTube, instead of in the auditorium. A Hybrid faculty meeting will be scheduled in fall 2016 to discuss this new modality of teaching 100w.

Faculty did not agree to add 10 more minutes to the Exit Exam time in order to match the WST change and so this change was not made on the directions. Faculty are also not in agreement about mandating a pre-writing period, some believe that preventing students from beginning
their writing process will improve planning and therefore writing. Other faculty believe that upper-division students, many of whom are multilingual, should be able to make use of the exam writing period in whatever way best serves their needs. All faculty agree that the exam time (75 minutes) and max/min length requirements must be standardized across all sections and these parameters were agreed upon and established in the template for exam directions that was distributed to all faculty. These directions will be the subject of a 2016/17 faculty meeting wherein faculty will be invited to discuss/revise/modify the standardized directions.

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?

**YES.** As per the BOGS GE guidelines for the course, Engineering 100w continues to require standardized curriculum across all sections with 11,000 words required of each student (8,000 for Area Z and 3,000 for AREA R). In addition to weekly reports on the GreenTalk series, the following five assignments continue to be mandatory in each section 1) Cover Letter Resume, 2) Analysis of a Peer-Reviewed Journal Article, 3) Q &A with a Professional Engineer (Interview), 4) Planning Memo and Presentation, 5) Formal Proposal (with library research and APA citations) and Team Presentation. In addition, students must take the Exit Exam in order to pass the course.

(4) 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.

All faculty provide detailed feedback on weekly GreenTalk reports and on the five formal assignments. All sections include a minimum of two graded class presentations with instructor feedback.