General Education Annual Course Assessment Form

Course Number/Title Combination of two courses (see below)  GE Area R

Results reported for AY 2017-18  # of sections # of instructors

Course Coordinator: (see below) E-mail:

Department Chair: Jeff Honda 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 SLO(s) were assessed for the course during the AY?

Biological Science majors satisfy the requirements for GE Area R through a combination of courses. All students first complete a course in genetics (either Biol 115: General Genetics, Biol 118: Evolutionary Genetics, or Micro 166: Microbial Genetics), after which they complete a capstone course in their own discipline. During the 2017-18 AY, students were assessed for content in their genetics courses, and the writing requirement in their capstone courses.

Content: Diversity, Civic Learning, and Scientific Study of Life Forms
• Biol 115: General Genetics. Instructors: Drs. Rachael French and Miri VanHoven
• Biol 118: Evolutionary Genetics. Instructor: Dr. Leslee Parr
• Micr 166: Microbial Genetics. Instructor: Dr. Elizabeth Skovran

Writing
• Biol 135B: Eukaryotic Cell and Molecular Biology (BS Molecular Biology). Instructor: Dr. Julio Soto
• Biol 160: Ecology (BS Ecology and Evolution, BS Marine Biology, BA Biology) Instructor: Dr. Scott Shaffer
• Biol 178: Integrative Physiology (BS Systems Physiology) Instructors: Dr. Jennifer Johnston
• Micr 127: Microbial Physiology (BS Microbiology) Instructor: Dr. Sabine Rech
(2) What were the results of the assessment of this course? What were the lessons learned from the assessment?

For all courses, students were considered to have mastered the learning objective when they achieved a score higher than 89%. An average performance was a score between 70-89%. Students who received a score below 70% failed the GELO.

A) Content

**Biol 115: General Genetics:**

**Content Item 1: Diversity**
In an activity discussing eugenics, students were asked to consider the issues of diversity associated with the involuntary sterilization of 65,000 American citizens. Of the 149 students in the class, 120 (81%) mastered the assignment, while 29 (19%) failed it.

**Content Item 2: Civic learning**
For this area, students were assessed via an essay question on a quiz regarding the ethics of Cas/CRISPR germline editing. At this point in the semester, there were 144 students in the class. For this assignment, 84 students (58%) mastered the content, 24 (17%) had an average performance, while 36 (25%) failed the GELO.

**Content Item 3: Study of Scientific Life Forms**
For this area, students were asked about comparative genomics on a quiz. For this assignment, 84 students (58%) mastered the content, 24 (17%) had an average performance, while 36 (25%) failed the GELO.

**Biol 118: Evolutionary Genetics:**

**Content Item 1: Diversity**
Students were asked to search for and identify a contemporary evolutionary biologist to whom they could relate because they shared ethnicity, gender, orientation, economic status, country of birth, upbringing, religion, and/or research/ academic interest(s). Students were asked to write a report explaining the biologist’s contribution to evolutionary biology. Of the 46 students in the class, 30 (65%) mastered the assignment, 9 (20%) had an average performance, and 7 (15%) failed the GELO.

**Content Item 2: Civic learning**
Students were asked to answer a question on an exam regarding the overuse of antibiotics and its relationship to the evolution of multiple antibiotic resistance pathogenic bacteria in food service and hospital settings. Of the 46 students in the class, 40 (87%) mastered the question and 6 (13%) failed the GELO.

**Content Item 3: Study of Scientific Life Forms**
Students were asked five questions on an exam to assess their knowledge of the scientific study of both extinct and extant (living) forms including viruses, bacteria, plants, dinosaurs, reptiles, birds, fish, mammals, and in particular primates and Hominids including contemporary humans. Of the 46 students in the class, 16 (35%) mastered these questions, 19 (41%) had an average performance, and 11 (24%) failed the GELO.
Micr 166: Microbial Genetics:

Content Item 1: Diversity
For this area, students were asked to choose one of the women scientists they discussed in lecture. They were asked to discuss her major research accomplishments and how that helped advance the field of genetics and what challenges she faced in her career. Of the 20 students in this class, 13 (65%) mastered the concept, 5 (25%) had an average performance, while 2 (10%) failed the assessment.

Content Item 2: Civic learning
Students were asked on an exam how they would design/carry out an experiment using complementation to identify the gene responsible for dehydropantoate reductase activity, which could lead to the development of new antibiotics, in T. pettium based on what is known about Salmonella enterica, which carries a mutation which eliminates all dehydropantoate reductase activity. They are asked to include the experimental overview (flow chart would work) and any media they would use. Of the 20 students in this class, 10 (50%) mastered the concept, 2 (10%) had an average performance, while 8 (40%) failed the assessment.

Content Item 3: Study of Scientific Life Forms
To be assessed in a future year.

B) Writing

Biol 135B: Eukaryotic Cell and Molecular Biology (BS Molecular Biology): In this course, students were asked to discuss environmental carcinogens on their third exam to evaluate GELO 3. Of the 19 students evaluated during Spring 2017, 18 (95%) mastered the concept, and 1 student (5%) failed the evaluation.

Biol 160: Ecology (BS Ecology and Evolution, BS Marine Biology, BA Biology): To meet this requirement, students completed two writing assignments. In the first, students compared and contrasted quadrat and plotless sampling techniques. In lab, they learned how to determine tree density using these two different sampling techniques. In the written assignment, they compared the two techniques with respect to how densities are computed and discussed strengths and weaknesses of each technique. Then, they made recommendations for when to use each. In the second assignment, students worked in a group using a computer simulation to determine an optimum strategy for preserving the Fender’s Blue butterflies. Each individual then made a written evaluation of each of the strategies and presented final recommendations.

Of the 41 students in this course during Fall 2017, 37 (90%) mastered the GELO while 4 students (10%) failed the GELO.

Biol 178: Integrative Physiology (BS Systems Physiology):

To meet this requirement, students wrote a review article on animal physiology in extreme environments that involves two or more organ systems. They were assigned to explore adaptations of a particular animal for living in an extreme environment (deep sea, extreme temperatures, etc) or what happens to a non-native animal that travels to that extreme environment. They were
required to cite at least 10 peer-reviewed, primary research articles. Of the 15 students in the class, 7 (47%) mastered the GELO while 8 (53%) had an average performance.

**Micr 127: Microbial Physiology (BS Microbiology):** In this course, each student was required to complete a 2000 word review paper focusing on one area of microbial physiology. The references for these papers had to have included at least 20 primary research papers from recent literature. Students were asked to write a 2000-word review paper that included at least 20 recent primary research articles. Of the 29 students in the course, 6 students (21%) mastered the assignment, 21 students (72%) had an average performance, while 3 students (7%) failed the assignment or did not complete the paper.

(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.

**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

(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 SLOs for writing.

All evaluated courses listed above represent the second part required for fulfillment of Area R requirement for our majors. Feedback for written assignments and documentation that students are meeting Area R GE SLOs can be either found or will be put on syllabi after review.