College of Sciences & Mathematics

Biological Sciences

Microbial, Molecular and Cellular Biology, BS

Expected Outcome 1: Ability to understand and critically evaluate scientific literature in the major

BIOL 4950 Undergraduate Seminar is a required course for all students majoring in one of the undergraduate degree programs administered by the Department of Biological Sciences. The course is taught both Fall and Spring semesters and has 18 or fewer students/section. The purpose of BIOL 4950 is to provide experience in the professional written and oral communication genres used in the biological sciences. Students present scientific papers using PowerPoint in a format typical of that used at professional scientific meetings. The expected outcome is that the student understands and explains the methodologies and findings of the paper effectively during the student’s presentation.

Assessment Method 1: Instructor evaluation of student presentations

Assessment Method Description

A rubric common to all sections was used by the instructor to assess each student’s presentation. This rubric addresses three skills: 1) Structure ideas clearly and expressively, using appropriate language free from bias and understand what it means to be an ethical and credible speaker; 2) Communicate candidly (in an open and direct manner) and effectively as an individual, in pairs, or in small groups; and 3) Actively listen to oral arguments and recognize when a recipient does not understand a message, adapting it as necessary.

Findings

On June 19th 2013 the five instructors who taught BIOL 4950 in the 2012-2013 academic year met to summarize and review the data. The results from the assessment of 53 students were considered. To determine the extent of competency of the average student using the rubric, the average score for each of the three skills was determined. It was decided that each of these skills should count equally towards overall competency. Based on these findings, the extent of competency of the average student is “advanced.” Most students exceeded our standards in all three
of the skills. In addition, very few students demonstrated a “basic” level of mastery, and no students demonstrated a general lack of competence (i.e., did not meet the standard).

**How did you use findings for improvement?**
We have not yet discussed the findings as a group. However, at the June 19th meeting there was extensive discussion of the rubrics (the course has a set of rubrics for a number of different assignments) and we found high agreement on their applicability. Findings will be disseminated to the faculty at a faculty meeting during the current academic year.

**Additional Comments**

**Assessment Method 2: Self-reported student evaluation of student learning outcomes**

**Assessment Method Description**
Graduating students in the program are requested to complete a survey to self-report on several learning outcomes. The survey asks them to respond to several learning outcome statements (listed below) using the following scale of Poor, Fair, Good, Very Good, Excellent.

**Learning outcomes**
- Ability to write scientific paper
- Analyze and interpret data
- Think analytically
- Apply general concepts in problem solving
- Formulate creative/original ideas

**Findings**
Data from 4 respondents were available from Summer and Fall 2013 graduates. In summarizing these we have used the following numerical scale: Poor=0, Fair=1, Good=2, Very good=3, and Excellent=4.
Mean scores for each of the learning outcomes are presented below:

**Learning outcomes**
- Ability to write scientific paper: 2.8
- Analyze and interpret data: 2.5
- Think analytically: 3.5
- Apply general concepts in problem solving: 3.5
- Formulate creative/original ideas: 2.5
Mean ratings were relatively high (3.5 out of 4) for *Think analytically* and *Apply general concepts*. The lowest mean was for *Formulate creative/original ideas* and *Analyze and interpret data*, with a value of only 2.5. *Ability to write scientific paper* was also fairly low, with a mean value of 2.8.

**How did you use findings for improvement?**
These results will be disseminated and discussed at faculty meetings to strategize how to boost student perceptions of program learning outcome success. Greater emphasis on writing scientific reports in lab classes may increase the score for *Ability to write scientific paper*, along with *Analyze and interpret data* as students will improve as they get more practice.

**Additional Comments**

**Expected Outcome 2: Compete successfully for jobs or positions in post-graduate or professional programs**

Graduating students will be able to continue into post-graduate or professional programs at other colleges/Universities or obtain employment.

**Assessment Method 1:** Survey of graduating majors

**Assessment Method Description**
We used 2 surveys: one by COSAM and one by OIRA. Graduating students in the program are requested to complete a survey to self-report on several program metrics. The survey asks them for their future plans and whether they have applied and been accepted into a post-graduate or professional program, or have obtained employment.

**Findings**
For the COSAM survey, data from 4 respondents were available from Summer and Fall 2013 graduates. Three either had applied for additional education or were intending to in the next year, but none of them was able to report successful enrollment at the time of the survey. The fourth student was unsure of plans but did not intend to apply for employment in a biological sciences field during the immediate future.

For the year 2012-2013, 29 Microbial, Molecular and Cell Biology students responded to the OIRA survey of graduating students. Of these 6 indicated that at the time of
graduation they were seeking employment. The majority of the students, 15, are planning to enter graduate school. Two were seeking other opportunities.

**How did you use findings for improvement?**

We will work with our COSAM Student Services office to receive better feedback from our graduates.

These results indicate that a significant percentage of our Microbial, Molecular and Cellular Biology students plan to continue their studies in graduate school. We will look for additional opportunities to provide them with experience in undergraduate research.

**Additional Comments**