Ohlone College
Program Review Report

- Program Description and Scope:
  1. Program Review Title: Biology
  3. Review Type: Instructional Disciplines
  4. Program/Departments: Biology (04000)
  5. Authority Code: 44-Dean, Sciences, Technology, & Engineering
  6. External Regulations: Yes__ No X
  7. Provide a brief narrative that describes the instructional program/discipline.

The Biology Program is designed to promote student success in subsequent educational programs they wish to enter and to instill in students an interest in biology. Some students within our program intend to transfer to a four year degree programs in biology, while other students have a goal to complete a vocational health sciences program, such as nursing, dental hygiene, physical or respiratory therapy programs, pharmacy or physician assistant programs. Finally, some students in our program are taking our courses as a general education requirement. The Biology Transfer Program offers a regimen of science courses equivalent in content and quality to the core freshman or sophomore science courses for biology majors at four year institutions. The Allied Health sciences students are completing prerequisite courses required to apply to health science programs. Although the majority of students in the program are intending to pursue a career in biology or health sciences, we also offer courses that fulfill general education requirements and/or personal interest.

8. Describe how the program specifically serves students, faculty and staff:

We provide a variety of pathways fashioned to meet a range of career goals. Our program offers sequences of courses for students that are intending to transfer to a four year biology degree program that fulfill lower division requirements for most biology programs at UC and CSU. Student completing the proper sequence may obtain an Associate of Sciences degree in Biology. A Allied Health Sciences certificate may be earned by students applying for vocational health sciences programs such as nursing, physical therapy, physician assistant and dental hygiene.

9. Describe how the program addresses current needs and applies current technologies.

All current biological and medical fields are strongly technology dependent, utilizing state of the art instrumentation and approaches. Our program employs modern instrumentation and emphsizes scientific approaches to
knowledge acquisition and analysis.

10. Discuss the impact of the program on the college and/or other programs.

The quality of the pre-requisite courses needed by students as they enter health sciences professional programs or transfer programs at other institutions is a strong predictor of their success within these professional programs. Student success requires high quality pre-requisite courses that give the student an adequate foundation in both practical and theoretical aspects of biology.

11. Discuss the impact of the program on the community and the impact of the community on the program.

A shortage of health science professionals presently exists locally and nationwide. Nurses in particular are in short supply as many of the present nurses are approaching retirement while the baby boom generation is reaching the age where health needs are increasing. In addition, many of the students in the transfer biology degree program are intending on studying medicine or engaging in biological research. These are growth industries in the Bay area. For our general education students our courses provide a basic understanding of biology and human health critical for informed decision making in later life.

- College Mission

1. Core Values, Goals & Objectives:

College Core Values
- We provide life-long learning opportunities for students, college personnel and the community.
- We open access to higher education and actively reach out to under-served populations.
- We promote diversity and inclusiveness.
- We maintain high standards in our constant pursuit of excellence.
- We value trust, respect and integrity.
- We promote team work and open communication.
- We practice innovation and actively encourage risk-taking and entrepreneurship.
- We demonstrate stewardship for our human, financial, physical and environmental resources.

College Goals/Objectives
1. Through innovative programs and services, improve student learning and achievement.
   1. By 2013, complete an assessment of student learning outcomes for all courses and programs.
   10. Provide instruction that will consistently allow Ohlone transfer
students to perform in their junior year at the university at a level at or above that of students who started at the university as freshmen.

2. Briefly describe how the program supports the college mission, vision and one or more of the college values.

The Biological Sciences program addresses two key parts of the college mission: successful transfer of students to four year institutions and entry into health science professional programs. Additionally our program offers a number of general education classes that meet the mission of personal enrichment. Additionally the program is designed to support a diverse group of students in meeting high academic and professional standards through a setting where innovative thinking is rewarded. This is accomplished by traditional instruction, group and individual projects and hands on laboratories.

3. Briefly describe how the program supports the selected college goals.

Students are challenged within our program with critical thinking essay and problem-based examinations, they work in groups on case studies. In laboratories students use the scientific method to gather and analyze biological data and draw appropriate scientific conclusions. Students work in groups to design presentations that review key concepts for the entire class.

4. Briefly describe how the program supports the selected college objectives.

Students who have completed our program are well prepared for transfer at the junior level in a biology major or entry into health science programs (nursing, physical therapy, pharmacy and respiratory therapy).

• Program SLOs & Assessment

1. Program SLO -

   Critical thinking skills: Students will be able to compare and contrast information from diverse sources. Students will demonstrate the ability to organize information into different formats using table and graph interpretation skills. The students will demonstrate their understanding through exam and assignments that require students to explain principles in their own words and demonstrate their ability to integrate facts and paraphrase concepts. Students will be able to relate new concepts to previously learned information.

   a. Indicate program assessment strategies used.
      i. Performance Assessment
b. Describe the criteria and standards used to appraise student work.
c. Enter assessment results and analyze student success in achieving this program SLO.
d. Describe revisions in curriculum or teaching strategies implemented to promote student success.
e. Future Action (Improvements)

2. Program SLO -

Students will demonstrate the correct operating procedures in the use of common lab equipment (for example, compound microscopes, spectrophotometer, pH meter, electrophoresis gel apparatus, micropipetters, and centrifuges)

a. Indicate program assessment strategies used.
   i. Rubrics
   ii. Skills Assessment

b. Describe the criteria and standards used to appraise student work.

A rubric is used ranking students as follows:

4. Student can correctly use instrument, completing all of the required steps in it use in the proper order.

3. Student performs most of the steps in the proper order, but omits one or two minor, non-critical steps.

2. Student omits many steps, including critical ones, or performs them out of order.

1. Student cannot operate instrument.

c. Enter assessment results and analyze student success in achieving this program SLO.

At the start of the semester students in 106 earned an average of 3/5 and at the end the scores rose to 4/5 in 5 point rubric. This 5 point rubric would translate into 40% of the students entering microbiology at level 3 in the assessment rubric (Student performs most of the steps in the proper order, but omits one or two minor, non-critical steps) and at the end of the course 80% of the students were at level 4 (Student can correctly use instrument, completing all the required steps). Since microbiology has the pre-requisite of Biology 130, we need to measure the expertise gained by students within this course to fully evaluate the rubric used in microbiology.
In Biol 101 a question asking students to set critical illumination on a light microscope was embedded in lab practical exams, once in the 1st semester (Biol. 101A) then again in the second semester (Biol 101B). In the first semester, 51% performed the procedure correctly; 17.6% knew the procedure, but unsatisfactorily executed it; 31.4% didn't know the procedure. When retested in the second semester, 60% performed the procedure correctly; 18.5% performed unsatisfactorily; and 21.5% didn't know the procedure. This shows about a 9% improvement from one semester to the next in the number of students able to set critical illumination on the microscope correctly.

d. *Describe revisions in curriculum or teaching strategies implemented to promote student success.*

Adjust ways to collect data so that a common method is used in courses within the program that require students to use a microscope. Apply those methods of assessment to all appropriate courses.

e. *Future Action (Improvements)*

3. **Program SLO -**

**Students will demonstrate common laboratory safety practices.**

a. *Indicate program assessment strategies used.*
   i. Skills Assessment

b. *Describe the criteria and standards used to appraise student work.*

c. *Enter assessment results and analyze student success in achieving this program SLO.*

d. *Describe revisions in curriculum or teaching strategies implemented to promote student success.*

e. *Future Action (Improvements)*

- **SLO Matrix**

  *Key: I-Introduced, P-Practiced with Feedback, M-Demonstrated at the Mastery Level*

<table>
<thead>
<tr>
<th>Course</th>
<th>SLO-1</th>
<th>SLO-2</th>
<th>SLO-3</th>
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<td>BIOL 130</td>
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• Course SLO & Assessment
• Student Achievement: A series of measures including course completion, course retention, persistence, program completion, and others.

1. List expected student achievement outcomes:
2. Analyze changes in data, identify trends, and provide possible contextual explanations for each measure used. (Example measures include: course completion, course retention, persistence, program completion).

Data from Mike Bowman's report on Instructional Summary Data by Department shows that total enrollment is approximately the same as in 2004. This represents a drop from 2006 of about 60 students per year. This likely represents a cut of the number of sections offered due to budget constraints since demand for enrollment remains high.

According to the same source there has been a significant increase in retention from 2004 to 2010. Retention increased from 57% in 2004 to 73% in 2010. This may have been caused by the Datatel's enforcement of pre-requisite courses having been taken.

3. Analyze program budget trends and expenditures. Comment on how the program can best use budget resources.
4. Analyze the program's current use of staff, equipment, technology, facilities, and/or other resources. Comment on how the program can best use these resources.

A significant increase in the modernization of equipment in some courses has occurred largely due to acquiring donations from local biotechnology companies. A small grant to increase pre-nursing students access to the pre-requisite courses enabled the purchase of anatomy and physiology models and slides.

The establishment of a separate biotechnology department has impacted the staffing of the biology department. Staffing for biology has decreased significantly in the last (loss of one fulltime technician) in the past few years.

5. Describe any additional notable program achievements (optional).
6. Additional Program Table Data
7. Future Action

Strategies to improve student achievement indicators. Specify.

Enrollment demands remain high while staffing is insufficient to meet these demands. Expansion of sections in these high demand classes should be supported in the future.
• Program Analysis
  Based on your assessments in the previous sections, focusing on SLOs and student/program achievements analyze and summarize your findings. This information will be used to develop your Program Improvement Objectives (PIOs).

  1. Describe program achievements and successes.

     A significant increase in retention has been accomplished in the past 5 years. This has been accomplished despite the loss of one full time faculty. This has meant fewer students have had access to courses, but more of those students succeeded within the classes.

  2. Describe plans for improvements for student learning outcomes and/or student/program achievement.

     We have been assessing only one aspect of the second SLO. In the future we need to designed program level appropriate assessments for the remaining SLOs. Within each separate class we have assessments for those SLOs, but have not devised a common strategy to examine them for the whole program.

• Program Improvement Objectives:
  1. Objective:

     Update and modernize the Biology Transfer and Allied Health programs so that they are in line with present state and anticipated directions in these areas. This will be achieved through:

     1. Increasing the interactions between science faculty in different disciplines by sharing a common building. The current conditions with science faculty and laboratory equipment are scattered in several building and on two campuses has been detrimental to developing learning communities. It has been impossible to make maximum use of valuable and expensive scientific equipment because their disparent locations.

     2. Increasing the number of faculty. Their is a dire need to have a consistent level of instruction in the pre-health sciences program. For numerous years we have had a parade of part time faculty through this program due to the high demand for multiple sections.
3. Facilities: Laboratories are more than 40 years old and woefully need to be brought up to present day safety and technological standards. In an increasingly technologically driven age, biology laboratories require extensive modern equipment. The present infrastructure cannot support such modern equipment (ventilation, electrical grid, temperature control, etc.).

4. Equipment: there is a need to upgrade many types of laboratory equipment. For example, dissecting and some compound microscopes have not been replaced in over 40 years and many are not longer functioning nor repairable. Furthermore, the program has grown and the need for more of this type of equipment has grown as well.

a. Action Plan
   Year 1:
   Purchase additional new dissecting microscopes and light sources as well as power-lab probes to support laboratory courses. Plan the use of the new building so that appropriate faculty, staff and laboratories are brought into the most efficient configuration. Design areas where faculty can interact and work on program enhancements. Design areas where students can interact and study together.

   Year 2:
   Interact with architechs and contractors to determine if the plans for the building meet with the intended use for the laboratories and teaching or staff spaces. Determine equipment needs based on building/laboratory and room design.

   Year 3:
   Ordering equipment.

b. Staffing
   Year 1:
   prioritize which faculty & continue using/adding adjuncts

   Year 2:
   recruitment for full time faculty/staff
Year 3:
hire new faculty/staff & reassess needs

c. Equipment (Include items that fit under department budget codes)
   Year 1:
   Survey the present condition of the laboratory equipment we have and
determine what needs to be modernized or replaced then prioritize these
needs. Replace or upgrade microscopes that exceed 30 years old and
replace broken Powerlab modules. Purchase Powerlab modules to replace
the previous computer assisted system used in the transfer biology
program. Replace aged microscope slides and increase exemplars of each
slide series.

Year 2:
bid out

Year 3:
purchase

d. Technology (Include items that fit under IT budget codes)
   Year 1:
   assess & prioritize & examine room design so IT can address the needs of
the new laboratories

e. Facilities (Include items that fit under the Facilities budget codes)
   Year 1:
   examine ventilation planning for science amounts of power

f. Assessment Plan: List Assessment Strategies
   Year 1:
   eg completed if building planned, eg interview faculty on their rooms
power, ventilation

g. Which college goal(s) does this program improvement objective work to
achieve? Clearly describe how your PIO will help achieve one or more of
the college goals and objectives, has impact beyond the particular
department, and contributes to student learning/success.
1. Through innovative programs and services, improve student learning
and achievement.
Rationale:

Bringing the sciences together in the same facility will foster better
communication between faculty in the development of curricula that is
better integrated across interrelated disciplines, thereby benefiting student
achievement.

3. Promote continuous, needs-based, learning and professional
development opportunities for all district personnel.
Rationale:

Much of the laboratory equipment was bought when the original campus
was built. This needs to be modernized. Modern equipment will require
and faculty to be trained in the use of this equipment.

4. Use human, fiscal, technological, and physical resources responsibly,
effectively, and efficiently to maximize student learning and achievement.
Rationale:

Bring together multi-disciplinary department that use similar laboratory
equipment and infrastructure will increase the efficiency of
staff/technicians and maximize the financial investment in the laboratory
facilities.

7. Increase access to higher education of under-served and
under-represented demographic groups in the District and local
communities.
Rationale:

Bringing together multiple scientific departments into a common building
will allow faculty to establish and maintain learning communities to better
support student success across related disciplines. In addition, study
spaces for students to interact and tutorial centers can be designed into the
new building.

2. PIO Assessment

a. Analyze the impact of reallocation or addition of resources. If money or
resource was not used, give rationale.

time

b. Future Action
   Strategies to promote improvements. Specify.