

# Long Beach City College - Program Review

## Program Review 2015-16 - Biological Sciences

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#### **PR 2A - Enrollment Data:**

The Life Science department is committed to providing students with a broad understanding of the sciences by offering a variety of classes in anatomy, biology, and physiology. Our goal is to help students successfully achieve an associate degree, transfer to a 4-year institution, or fulfill the prerequisites for nursing or allied health programs. The department offers lower division courses that give students a broad perspective in the sciences, and advanced classes for those who wish to enter a health profession. These advanced classes are often in high demand with long wait lists because they fulfill the prerequisites for the Nursing Program at Long Beach City College.

#### ANATOMY

Annual enrollment in anatomy has increased from 954 to 1255 over the past three years (2012-13 to 2014-15). This is because the department has increased the number of sections being offered annually from 23 to 33. Although demand for these classes remain high, the added sections have reduced total wait list numbers from 1453 (2012-13) to 680 (2014-15). The department cannot offer any additional sections because we are limited by the available lab space and qualified instructors.

Hispanics have traditionally been the largest ethnic group enrolling in anatomy. This trend has continued during 2014-15 with Hispanics comprising nearly 50% of students who enrolled in anatomy. In terms of gender, females comprise the majority (70%) of anatomy students. The ethnic and gender makeup of anatomy students is consistent with that of the entire department, and probably reflects the demographics of the area around the college.

#### BIOLOGY

Annual enrollment in biology has increased from 3608 to 4783 over the past three years in response to the increase in section offerings from 77 to 119. Between 2012-13 and 2014-15 the Life Science department added 18 additional sections at LAC and 19 additional sections to PCC. Improved access to classes resulted in dramatically lower wait lists. During the 2012-13 academic year there were 977 students on biology wait lists compared to 224 during the 2014-15 academic year.

Consistent with the rest of the department, Hispanics make up the largest ethnic group enrolling in biology growing from 49% to 53% over the past three years. In terms of gender, females made up 58% during the 2014-15 academic year.

#### PHYSIOLOGY

Annual enrollment in physiology has dropped slightly over the past 3 years from 353 to 334 probably due to the decrease in section offerings from 9 to 8. Even with this drop in section offerings the wait list number dropped from 243 to 191. Hispanics increased from 33% in 2012-13 to 45% in 2014-15. Females continue to comprise over 70% of students in physiology.

Despite the department adding additional sections of anatomy and biology over the past three years, there were a total of 1095 students on wait lists for the entire Life Science department. The enrollment data reveal a diverse student population. In particular the number of Hispanic/Latino students who enroll in a life science course has increased as we have become a Hispanic-serving institution.

#### **PR 2B - Achievement Data:**

Overall, the faculty of the Life Science department has worked hard to meet the demands of a diverse student population while maintaining high academic standards for those students.

#### ANATOMY

Anatomy 1 is often the first course taken by many pre-nursing students, and can be a challenging way to begin the sequence of prerequisites. Therefore, the overall success rate for anatomy (3 year avg. = 40%) is less than the average college wide success rate of 64% over the same period. The previous program plan cited a success rate of 45% and predicted that it would decrease with the closure of the Life Science Learning Center. The current rate of 40% supports that assertion and demonstrates the impact that the closure of the Life Science Learning Center has had on our students.

It is interesting to note that even though Hispanics make up the majority of anatomy students, their average success rate is only

34%. Whites had the highest rates with an average of 55%, and Black/African American had the lowest with 31%. It is also interesting to note that success rates were much higher during the summer of 2013 & 2014 (58% & 66%). These increases may be because students take less classes in the summer and can focus more on anatomy, or the increased frequency of class meetings. It may also be that students who take summer class may be more academically ambitious.

## BIOLOGY

In biology the average success rate was 61% over the past three years. This is only slightly lower than the college wide average of 64%. Even though the average rate was low, Hispanics did increase their success rates from 58% to 60% and Whites from 61% to 74% over the three year period. Black/African Americans decreased their success rates from 54% to 50%. The department would like to investigate this trend and devise strategies to improve success rates across all ethnic groups.

## PHYSIOLOGY

Success rates in physiology were higher than anatomy or biology with an average of 64% over the three year period. This higher rate can probably be attributed to the anatomy prerequisite. By the time students pass anatomy, they have become better at handling a rigorous science class.

As far as retention, physiology had an average rate of 90% from 2012-13 to 2014-15. This rate is much higher than the average anatomy rate (67%) or biology (83%). The high physiology retention rate is probably explained by students becoming informed about the impact of a "W" in a science course on the GPA calculated for ADN admission. As a result, students earning an "F" or "D" often elect to stay in the course and receive a letter grade rather than withdrawing.

## **PR 2C - HR (Staffing) Data:**

### FACULTY

The department currently has 10 full-time and 20 part-time faculty. Since 2003 the number of full-time faculty has been reduced from 15 to 10, and has put a limit on the diversity of our course offerings. This situation is compounded by the transition in curriculum and resources to teach the high demand classes of Anatomy, Physiology, and Microbiology. These courses with lectures and labs are required by the Board of Registered Nursing for prospective nursing students. Since the department serves as a critical educational pathway for students entering nursing and allied health programs, teaching loads have necessarily been increased in these areas. This shift in resources has limited the number of faculty available to teach general biology courses. As a consequence, we are unable to offer a variety of field classes (mountains, deserts, birds etc...) that the department has traditionally taught.

The reduction in full-time faculty has also resulted in some outdated laboratory curriculum. With most of the full-time faculty focusing their efforts on nursing prerequisites, courses like 60 Lab have been entirely taught by part-time instructors. As a result, the curriculum has become outdated. The hiring of at least one additional full-time instructor will allow us to update this laboratory and also begin to offer it at PCC.

Data reveals a continued demand for general biology courses (and other departmental courses) with about 300 - 1500 students added to wait lists each semester over the past 3 years. Students have informed us that they are often turned away several times before being able to add a biology class. This impedes a fluid pathway to success. In order to alleviate these long wait lists and serve as many students as possible:

1. Several double and triple-size classes are offered each semester.
2. Many faculty elect to over-fill their classes on the first day. For example, the spring 2015 Program Load (WSCH/FTEF) for Biology was 767, and for Anatomy & Physiology was 812; compared to the college-wide load of 527. Although this strategy gets more students in the classroom, the low success rate of 61% leads the department to believe that the larger class sizes are not beneficial. More dedicated full-time faculty will allow us to offer more single size sections and eliminate over-filling of classes.

Despite the low number of full-time faculty, the department has seen an increase in enrollment and student access over the past three years as stated above. We have done this by increasing section offerings, teaching overload, and maintaining an average of 20 part-time instructors that teaching all disciplines Monday-Friday, and one Anatomy course on Saturday.

The addition of one new full-time faculty in 2013 has allowed us to slightly increase our course diversity. We now are able to offer BIO 5 (Plant Biology) on a regular basis and BIO 11 every semester. Previously, these classes were taught rarely or not at all over the past 10 years. This same new faculty member now holds office hours at PCC three days a week. Before this, students had minimal access to faculty at PCC.

### CLASSIFIED STAFF

During the last review cycle the department has lost one full-time classified person due to lay-offs and one 16-hour classified person who resigned. These staff reductions have forced us to close the Life Science Learning Center, which used to serve

virtually all biology, anatomy, and physiology students. The department feels that this closure is a large factor in the low success rates in all our disciplines.

The department currently has 3 full-time classified staff at LAC and one 16-hour (shared with physical science) at PCC. Over the program review cycle, the full-time classified contract was reduced from 12 months to 10. This has put a great strain on their work load and on our ability to offer summer and winter sections. This past year their contract was restored back to 12 months and now we are able to offer year-round classes again. One full-time classified staff is entirely responsible for supporting the laboratory needs of BIO 2 (Microbiology), and the other two are responsible for supporting the rest of the lab courses.

In the fall of 2015, a 16-hour classified staff person was hired to support the labs at PCC (shared with physical science). As a result, the quality of the BIO 41 Labs offered at that campus has improved and we are now have the support to add additional lab sections at PCC. Before this new hire, the existing classified staff at LAC had to move between campuses, spending a great deal of time on the road. This was inefficient use of their time.

### **PR 3A - SLO - summary of collected program data:**

During this past review cycle (2012-13 to 2014-15), faculty in the Life Science Department have continued to collect SLO data and submit it to our SLO officer who then enters it into TracDat; and helps in other ways to facilitate the ASLO process. Data was collected for all currently taught Life Science courses and faculty members have been meeting within their respective disciplines to discuss the process and the outcomes of program and course SLO assessments. Adjunct faculty have been encouraged to participate in the process as well. Based on the analysis of assessment data questions were raised in regard the SLOs themselves, expected outcomes, and assessment tools.

#### **PROGRAM LEVEL**

The department originally developed 3 program level SLOs to assess students taking courses in our department. These program level SLOs were assessed at the end of the last review cycle. Multiple courses contributed to the assessment of each program SLOs.

1. – Critical Thinking: Expected level of achievement = 70% of students will achieve 70% on embedded questions/assignments. Data was gathered from BIO 41, 1A, 2, HELD 3, 5, & 10. Results varied from 40% to 94% with the average achievement being 67%.

2. – Levels of Biology: Expected level of achievement = 70% of students will achieve 70% on embedded questions/assignments. Data was gathered from ANAT 1, 41, BIO 60, 41, 1A, HLED 3, 4, & 10. Results varied from 40% to 74% with the average achievement being 62%.

3. – Diversity of Organisms: Data was gathered from BIO 41, 1A, 2, 20, HLED 3, 4, 5, & 10. Results varied from 40% to 94% with the average achievement being 64%.

During the current review cycle the department has had a chance to reflect on the validity of the original assessment methods and the results of these Program SLOs. From this reflection several problems emerged. One of the main problems is that data was collected from multiple courses for each Program SLO using various assessment methods. Some courses used embedded questions in an exam, some courses used a project (e.g. = microbiology used the identification of an unknown organism project), and one course used a before and after assessment to look for improvement as an indicator of achievement. This, combined with inconsistent reporting methods, probably account for the large range in assessment results (see above) – making the average achievement for each SLO of little value. Another problem is that much of the assessment data came from Health Education (HELD) courses. Since the original assessment, HELD was moved from the Life Science Department and is now part of Kinesiology.

It became apparent that some sort of uniform assessment tool and expected level of achievement would yield results that are more statistically valid. It also became clear that our program has changed. The department has not only lost HELD, but will soon be adopting the newly released Transfer Model Curriculum (TMC) in biology to comply with the requirements for the soon to be offered Associate Degree for Transfer (ADT) in biology. Because of this, the department has not re-assessed the initial Program SLOs, but has instead began work on a new ASLO process that will better reflect our program.

#### **COURSE LEVEL**

Course level SLOs have been continually assessed during the current review cycle. All currently taught courses have assessment results with actions taken. Even so, department members have been seeking better ways to assess, analyze and interpret the data. To help with this we had several meetings with the Educational Assessment Research Analyst. With her help, we streamlined the course SLO process for a number of our courses by reducing the number of course SLOs and simplifying the existing ones to make them more meaningful. The department is now looking forward to new assessment

results that will emerge from the improved Course SLOs.

### **PR 3B - SLO - uses in program improvement :**

#### **PROGRAM LEVEL**

Even though there were problems in the implementation of our Program SLOs (e.g. = multiple courses and inconsistent assessment tools), the process still yielded some positive results in our program. Faculty members have necessarily become engaged in an on-going dialog to explore new ways to improve the ASLO process for our program and ultimately improve the learning of our students.

Part of this exploration involves re-looking at our Program SLOs and re-writing them so that they align with the soon to be offered ADT in Biology. Our current program, which consists of an AA or AS degree, only requires students to take 9-12 units from any ANAT, PHYSI or BIO course. Trying to assess Program SLOs in this variety of courses has led to the problems mentioned above. The re-focusing of our program to match the TMC in biology will greatly improve the ASLO process. The new ADT will require all students to take BIO 1A and BIO 1B (10-units). These courses will then be used to assess Program SLOs, which will greatly streamline the ASLO process and the students' pathway through our department.

#### **COURSE LEVEL**

Each faculty member evaluates Course SLO data for their area of responsibility and formulates an appropriate course of action that can lead to improvement. In the case of BIO 20 (Marine Biology) and BIO 30 (Wildlife Biology) SLO assessment revealed that most students met the established criteria (60% of students will achieve 66% on the assessment). Even so, after looking carefully at the data, faculty felt that the SLOs were either too specific or too broad and did not reflect the overarching concepts. The data coming from these assessments, therefore, was not representative of what the students were being taught and should be learning. As a result of these assessments, the faculty re-wrote the SLOs for both courses to better reflect what the students should be learning. In doing so, the faculty teaching these courses have a better grasp themselves on what concepts are being taught and how they are presented to the students. Other courses such as BIO 60 (Human Biology) and BIO 2 (Microbiology) are following the same course of action after looking at their assessment data. This ASLO process will undoubtedly lead to more valid data and improved student outcomes.

In the Case of BIO 5 (Plant Biology) SLO assessment was very useful for improvement. After 12 years of not offering this course, the department offered it again in 2013. The faculty member in charge of this course used pre/post-tests to assess the SLOs. She reported that 15 students finished the course and had an average post-test scores of 75%, 100%, and 84%. Even though the criteria were met for all 3 SLOs, the instructor took the time to really examine the tests themselves and the results. She decided to make some key improvements including changing her testing format to make it more user friendly, and re-arranged the order that concepts are introduced in the course.

### **PR 3C - SLO - action/ change based on results:**

The Life Science Department used this past review cycle to try to make sense of the reported Program SLO data. Based on the results that were reported, we decided that a more uniform testing approach and expected level of achievement was needed. We already have begun to re-write our 3 program SLOs (see section 3A) to bring them in line with the soon to be offered ADT in biology.

Although all regularly offered courses now assess SLOs (with results and actions taken in TracDat), the department realizes that we are still in the early stages. Data from the earlier cycles is considered preliminary and we are looking forward to collecting and analyzing data from additional assessment cycles.

### **PR 4A - Projects/ Strategies-development & change:**

The Life Science Department has established projects and strategies to promote student success and to fulfill our multi-fold mission of 1) transfer preparation, 2) preparing students to attain an associate degree, and 3) helping students satisfy life science prerequisites for various programs at LBCC and other colleges. In order to do so, we have developed projects and strategies over the past three years that address matters of enrollment, achievement, staffing, and ASLO data (See 1-3 above). We have developed projects and strategies to increase section offerings (to alleviate long wait lists), to re-open a Science Learning Center (to improve success and retention rates), and to hire additional full-time faculty (improve staffing). We are also in the process of refining the way we create, implement, and assess program-level and course-level SLOs.

### **PR 4B - Projects/ Strategies - results:**

#### **PROJECT/STRATEGIES IN PROGRESS**

- Develop an On-line Bio60 Course – to broaden our on-line offerings and to improve access to our courses. Two faculty members will be seeking on-line course development training. This is a new project that will be initiated this academic year.
- Revise Biology 60 Laboratory Curriculum – to match the current needs of the students taking this course. In fall 2014 we were approved to hire a new faculty member to take on this project. Interviews were conducted, but the limited application pool compelled us to declare a failed search. We are re-advertising this position (Anatomy/Biology Instructor – to start fall 2016) and will be more pro-active in seeking out a larger, more qualified applicant pool.
- Improve Student Success – to rely less on part-time instructors to teach some of our high-demand classes. The department is in the process of recruiting a new faculty member who will teach anatomy and biology courses. A failed search last year has led us to re-advertising the positing this year (see project above).
- Revise Biology 41 Laboratory Curriculum – to improve student engagement and learning. Two full-time faculty members have been met regularly to write new lab exercises or revise existing ones. Other full time and adjunct faculty have been involved as well. To date, 10 new exercises have been created or revised and are now being utilized in the classroom. Students are more engaged with relevant hands-on exercises. Revisions of some remaining labs will be completed in subsequent years.
- Update and Revise the Life Science Department Web Site – to provide current information about our program, courses, and faculty. Faculty responsible for this project were told that they must complete CMS training in order to edit the webpage themselves. Several attempts were made to attend the training, but scheduling conflicts prevented completion. Instead of editing the website themselves, faculty have sent changes to the webmaster who made the changes for us. The website is now revised with useful information for students. Updates to the website will continue in subsequent years.
- Native Plant Landscaping – create identification garden for use by horticulture and life science students. In conjunction with the grounds supervisor, horticulture department, and life sciences, several steps have been completed.
  1. The irrigation to the areas was modified to match the needs of the new plants.
  2. A grant was written to provide money for plants. Due to unforeseen circumstances, progress was halted and the grant money was lost.
  3. This fall (2015) our dean provided us with new money.
  4. The Horticulture Landscape Maintenance class cleared out old vegetation and prepared the area.
  5. Plants were purchased with the help of horticulture.
  6. A large Sweetgum tree was removed.
  7. New California Native plants were planted on the east side of the D-building by Horticulture's Landscape Maintenance class.
 The next step is to a student pathway and informational signs. The garden will be incorporated into the curriculum of several install Life Science classes and will serve as a model of drought-tolerant landscaping for all LBCC students, faculty, and the surrounding community.
- Regaining Life Science Learning Center Support – to re-open this vital student resource, which was closed due to budget cuts. Because of budget cutbacks, the Life Science Learning Center was closed at the end of spring 2012. The department has continually asked for funding to pay for staff to re-open the center. All funding requests have been denied. This is a significant loss to our students and will undoubtedly impact student success in many of our classes.

EQUIPMENT REQUESTS - Life Science laboratories require a great deal of instructional equipment to support student learning and success. Consequently many of our projects/strategies involve asking for new instructional and supporting equipment to replace old worn out equipment and/or to expand our laboratory offerings. The following is a list of equipment requests that are newly added to our department plan.

- Expand lab equipment at PCC – to be able to expand lab course offerings at our PCC lab (EE-211). Funded – purchasing will be initiated this semester.
- Replace prep-room dish washer - current one is leaking and presents a danger to staff and students. Funded – purchasing will be initiated this semester.
- Update Instructional Equipment for Microbiology Lab – replace unsafe hot plates with water baths. Funded – purchasing will be initiated this semester.
- Modernize equipment for BIO 1A lab - new spectrophotometers to teach students modern techniques. Funded – purchasing will be initiated this semester.
- Equipment for D-building remodel – to expand course offerings into new D-building 1st floor labs. Not funded – in progress; new project added to department plan this year.
- Equipment for Science Learning Center – for students use when new center opens on the D-building 1st floor. Not

funded – in progress; new project added to department plan this year.

- Instructional Technology Upgrades – for equitable learning experiences regardless of lab room. Not funded – in progress; new project added to department plan this year.

#### PROJECT/STRATEGIES – COMPLETED

- Usage of Musculoskeletal Models to Teach Anatomy

Anatomy students currently dissect cats to learn muscle names and locations. However, cat and human muscles are not identical. We now have the option to use this additional approach to study human muscles, which involves modeling muscles using clay. Students have responded positively.

- Increase General Biology Course Availability

Life Science department added 18 additional sections annually at LAC and 19 additional sections annually to PCC. Improved access to classes resulted in lower wait lists and improved student access.

- Develop Pathways to Student Success

The department has initiated a yearly Science Night. This event is held in conjunction with Math, Physical Science, and Anthropology. The results of this event include strengthening relationships between LBCC and the surrounding schools, as well as attracting current students to the Life Science world. This part of the goal supports the college-wide Promise Pathway goal.

- Replacement of unstable, dangerous, laboratory classroom chairs

The previous lab room chairs in our department used to be unstable. Students often would fall off of these chairs, and we feared that someone may become seriously injured. All of these old chairs have now been replaced with a model that is more stable. As a result, student safety in our department has greatly improved.

#### **PR 4C - Projects/ Strategies - future plans:**

We will continue to focus on our mission dedicated to supporting the President's and Board of Trustees goals for Student Success and in direct alignment with the Educational Master Plan. Among our plans include the following: 1) offer new sections of lecture and laboratory classes at PCC, 2) continue to pursue a way to re-open our Life Science Learning Center and/or support the development of a new center on the D-building 1st floor, 3) expand our regular semester and summer course offerings in anatomy, physiology, and microbiology (with the D-building re-model), and 4) continue to modify and assess program-level and course-level SLOs. In addition, work as begun on developing an ADT in biology. This new degree will help us to identify and track our biology majors and streamline their process through our program.

#### **PR 5 - Dept - how does it fit into big picture?:**

The Long Beach City College Mission Statement reflects the driving force for instruction in the Life Science Department as we value equitable student learning and achievement while upholding academic excellence. This has been a growing challenge due to the erosion of sufficient science-based preparation of the entering LBCC student population. The current program SLOs are being revised to bring them into better alignment with the soon to be offered ADT and to yield results that will be used to improve the program.

All of our department projects and strategies have been aligned with the Educational Master Plan Institutional Goals as presented below. Each of these projects/strategies has been discussed in detail in the Department Plan and in this Program Review.

Educational Master Plan: Institutional Goal #1. Long Beach City College will improve the rates at which students gain the foundational skills necessary to complete college level work and to achieve their educational and career goals.

Life Science Department Project/Strategy:

Native Plant Landscaping

BIO 60 L Curriculum Revision

BIO 41 L Curriculum Revision

Usage of Musculoskeletal Models

Regaining Life Science Learning Center Support

Pathways to Student Success

Increase General Biology Course Availability

Develop an On-line BIO 60 Course

Improve Student Success

Educational Master Plan: Institutional Goal #2. Long Beach City College will provide equitable access and support to its diverse students and will improve the educational progress and achievement especially for students under-represented in those outcomes.

Life Science Department Project/Strategy:

Pathways to Student Success

Update and Revise Life Science Department Website

Develop an On-line BIO 60 Course

Improve Student Success

Educational Master Plan: Institutional Goal #4. Long Beach City College will develop and focus its human, fiscal, facilities, technical and information resources in support of institutional goals.

Life Science Department Project/Strategy:

Replacement of Unstable and Dangerous Laboratory Chairs

Increase General Biology Course Availability

Improve Student Success

Various Equipment Requests (see list above)

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## **Project/ Strategy and Resource Needed**

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