College of San Mateo — Program Review Submission

2014-2015 Instructional Program Review

Program Name: **Biology & Health Science**
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Academic Year: **2014-2015**
Status: **Submitted for review**
Updated on: **03/30/2015 08:01 PM**

1. Description of Program

Provide a brief description of the program and how it supports the college's **College Mission and Diversity Statements**, **Institutional Priorities, 2013/14-2015/16**, **5 in 5 College Strategies, Spring 2011**, and other **Institutional Program Planning** as appropriate.

The Biology Department, including Health Sciences, is a vibrant, positive, successful member of the College community, with healthy student enrollments and a faculty that constantly strives to meet the challenges to student success. This department engages and challenges students in courses serving a range of educational goals, including transfer to baccalaureate institutions for science and non-science majors, prerequisites for programs including nursing and medical assisting and other allied health fields, and the Biology Department offers a General Health Science course. Biology and Health Science courses are currently taught by seven full-time professors and seven adjunct instructors, supported by one full-time lab technician. The department was able to hire one full-time faculty, who began in the Fall 2014 term. Biology classes are conducted in lecture and lab classrooms on the second floor of building 36, with occasional lecture classes on the first or third floor and in building 18.

For the academic year 2014-2015 the department offered 45 sections of 16 different courses in Fall semester and 38 sections of 13 different courses in Spring semester. Nine sections in Fall and ten sections in Spring were online lectures, and three courses' lab sections are web-assisted (BIOL 210, 220, 260).

The Biology department strives to be inclusive and equitable to all CSM students. Faculty and staff recognize, value, and reflect the diversity of the community they serve. The department has a dynamic learning and working environment that encourages multiple perspectives and the free exchange of ideas. Biology faculty are very active in supporting Institutional Priorities:

1. Student Success:

Student Success is a top priority for the department. The department provides student support through a variety of programs. Biology faculty both manage and work in two student learning support centers: the ISC (Integrated Science Center, 36-110) and the A& P (Anatomy and Physiology) Lab, 36-217. Courses in Biology and Health Science are also supported by Supplemental instruction and tutoring from the Learning Center. Faculty in the department use WebACCESS to support their classrooms, and make them themselves available to students through email, and office hours, and WebACCESS. Through the lecture and lab courses in Biology, students are provided hands-on and active learning opportunities. Several faculty have adopted another pedagogical framework called Reading Apprenticeship, which promotes a student-centered metacognitive approach to teaching and learning.

2. Academic Excellence:

Biology faculty routinely discuss student success in achieving course SLOs, and make adjustments to their teaching as new data emerges. Special attention is paid to the development of higher order thinking skills and scientific literacy. Biology Faculty have also been involved in the Honors Program. Biology faculty Christopher J. Smith taught the Honors Seminar, and several Biology faculty have been foundation course instructors. Faculty assess course SLOs, align course SLOs to CSM General Education SLOs, and have established program and degree SLOs. At the recent GE SLO campus discussion, Biology faculty represented the largest faculty group. Biology faculty maintain current course outlines through COI and have collaborated with Skyline and Canada college to establish common prerequisites for most 200-level courses.

The department has also partnered with San Francisco State to offer the CCSF/SMCCD/SFSU Bridges Programto its students. The program is designed to enhance the academic and career success of underrepresented minority CSM students in the biomedical sciences. Professor Tania Beliz is the CSM Program Coordinator. The program includes Science-In-Action Seminars and summer research internships for CSM

students.

Biology Professor Kathy Diamond and Physics Professor Mohsen Janatpour coordinate the UC CalTeach from California Teach Science and Mathematics Initiative that includes coursework and internships for students interested in a K-12 science teaching career.

Biology faculty demonstrate commitment to institutional excellence by serving on several committees that address academic excellence and student support, including Academic Senate Governing Council (Biology Professor Theresa Martin is the CSM Academic Senate Vice President), Learning Centers Committee, College Assessment Committee, Committee on Instruction, Evaluation Committee, Distance Education Committee, and others.

3. Responsive, High-Quality Programs and Services:

The Biology department has been at the forefront of distance education at CSM for many years. The Biology faculty strive to maintain online, hybrid and electronic supported classes at the highest quality by evaluating and implementing best practices and current models in online education. Student success in these courses often matches or exceeds success in face-to-face classes. Recently, several members of the department were granted professional development funds by the district Chancellor's office to develop an Extra-Large Online course (XLO) for Health Science 100. The faculty team developed a section of this course as a model for a larger-scale online class that is a model to improve effective contact and success in an online class. The XLO course section was offered Spring '15, and is being evaluated for its effectiveness, utility, and sustainability.

In addition, Biology faculty developed departmental standards for online teaching, mentor new online teachers, participate as STOT trainers, are on the Math/Science Technology Committee. Some courses are currently only offered online (BIOL 102, 145, 310), while some have both on-campus and online sections (BIOL 100, HSCI 100). The number of online sections increases every year as demand grows.

Biology faculty, along with Chemistry and Reading Faculty, implemented the use of Reading Apprenticeship (RA) at the College of San Mateo. Since the beginning Reading Apprenticeship workshop in the summer of 2012, Biology faculty have led the effort to expand the program across the campus, reaching more than 70 other faculty with training and support. Currently, seven Biology faculty (and one Chemistry faculty) are part of an RA STEM grant to develop and assess STEM curriculum using the RA framework. The RA STEM grant, funded by the Helmsley Trust, is managed by WestEd, an educational research and development organization. Members of the CSM RA STEM team are providing leadership for professional development components of the grant.

Biology faculty participated in the state-wide discussions leading to the development and implementation of the Associate of Transfer degree in Biology AS-T, as mandated by California Senate Bill 1440. They are currently assessing the Transfer Model Curriculum for Biology and also for Nutrition. Biology faculty have also attended the Biotechnology All-Hands Meeting to discuss the Transfer Model Curriculum for Biotechnology. Faculty made minor adjustments in the majors' biology sequence this year to align Cell biology, General Botany, and General Zoology with the course descriptors of the state system (community colleges and California State University faculty).

As mentioned previously, Biology faculty have been instrumental in providing academic support services to students. Not only did departmental faculty establish the Integrated Science Center and the Anatomy and Physiology Lab, they also were early adopters of Supplemental Instruction on this campus, and are key contributors to the Community College Biology Faculty Enhancement through Scientific Teaching (CCBFest), a National Science Foundation sponsored grant to improve Biology teaching administered by the Science Education Partnership & Assessment Laboratory (SEPAL) at San Francisco State University. Through the SEPAL center, the biology department has sponsored several graduate students aspiring to be Biology teachers, and have been able to hire adjunct instructors from recent graduates of the program.

4. Support Professional Development:

Biology faculty have provided professional development workshops and activities throughout the year. Activities presented include botany hikes, workshops on group work, tech support for WebAccess, Reading Apprenticeship workshops, science seminars, and others. Professor Theresa Martin has reassigned time to coordinate professional development for the campus.

5. Implement the Integrated Planning Cycle and Ensure Fiscal Stability and the Efficient Use of Resources

The Biology department participates fully in the planning cycle, and has been fiscally stable.

6. Enhance institutional dialogue

Faculty from the department participate in many cross-disciplinary activities, including serving on committees, supporting learning communities, providing professional development, and venues for interdisciplinary dialogue. They Biology Faculty strive to be open to new ideas and different perspectives. One of the newer campus initiatives that resonates with many of the faculty is the Habits of Mind initiative that helps students (and teachers) develop habits conducive to academic success, not least among the targeted habits are "listening with understanding and empathy", "thinking interdependently", and "communicating with clarity and precision". The faculty are learning how to integrate these "habits" into their curriculum.

2. Student Learning and Program Data

A. Discuss Student Learning Outcomes Assessment

1. Reflect on recent SLO assessment results for courses offered by the program. Identify trends and discuss areas in need of improvement.

The Biology Department assesses course SLOs approximately once every 2-3 years (some course SLOs are assessed yearly) and reports the assessment plans and results using TracDat. About 73% of the 79 course SLOs assessed in TracDat match the SLOs listed in the official course outlines. The latest assessments occurred either Fall 2013 or Spring 2013. For most courses, all of their respective SLOs are assessed on this schedule (some courses have a subset of their SLOs assessed). The next assessment cycle is Fall 2015 and Spring 2015. Most course SLOs are assessed through analysis of exam results. The criteria for successfully achieving a course SLO varies significantly between courses. Of the 64 course SLOs assessed in TracDat, 75% of them report to have met criteria for success. As a department we continue to improve our use of SLOs for assessment. Areas worth discussing as a department include 1) improving the frequency and scope of informal and formal SLO assessment (including more volunteered participation of part time faculty in the process), 2) providing more homogeneity in the methods used for assessing SLOs (such as using a common rubric), 3) revisiting the SLOs of some courses to improve on their pedagogical value and 4) engaging in more discussions focused on how to improve the performance of students, particularly in the problem areas as elucidated by the SLO assessment results.

2. Comment on the success rates in the program SLOs that are aligned with specific course SLOs. What do the program SLO and course data reveal about students completing the program? Identify trends and discuss areas in need of improvement. Is the alignment between course and program SLOs appropriate and informative? See **course-to-program SLO alignment mapping**.

Using the new alignment grid of course SLOs to program SLOs, we looked at the most recent assessment results of course SLOs as reported in TracDat (see above). These assessments span 4-5 years (the earliest data is for the 2009-2010 cycle). This data will serve as a baseline to which to

compare the results of the next SLO assessment cycle (Fall and Spring 2015). Across the 5 programs taught by the Biology Department, about 177 course SLOs map to the 23 Program SLOs. On average, a given program SLOs is evaluated by 7-8 course SLOs. Of the aligned course SLOs, 73% (129 course SLOs) have been assessed in TracDat (since 2009). The majority of SLOs not assessed in TracDat are official course SLOs (as listed on the current alignment grid) that do not match what is listed in TracDat. One Program SLO (AS Biology: Pre-Nursing SLO#2 “Explain the principles of evolution as a fundamental process of all biology”) is not currently assessed by any course SLO (as reported in TracDat). This mismatch is expected given that the SLOs in TracDat are updated more frequently than the official course ones. Many of these SLOs will likely become official in the future. We will work to assure that all official course SLOs are assessed in TracDat on the next assessment cycle (2015-2016).

Across the 5 programs taught by the Biology Department, the number of successful course SLOs (that meet the SLO success criteria reported in TracDat) is very low (72 course SLOs or 56% of the total number of SLOs assessed or 129). However, the range of success of the different Program SLOs (based on course SLO) is great. 8 (out of 23) program SLOs are 100% supported (all course SLOs were successful). 8 program SLOs were supported by less than 70% of the assessed SLOs. One Program SLOs did not have any successful course SLO (AS Biology: Medical SLO#2 “Explain the principles of evolution as a fundamental process of all biology”; although this evaluation is based on only two assessed course SLOs -most program SLOs are evaluated by 7-9 course SLOs). We need to improve the incorporation, discussion and assessment of evolutionary topics in our two health-related programs. As a Department, we will have focused discussions on how to improve the success rates of our students, particularly in regards to the most problematic course SLOs, as well as on improving the frequency, scope, and homogeneity of the SLO assessment process.

3. Evaluate the program SLOs in relation to survey data from the degree and certificate award earners survey. What does the survey data reveal about the effectiveness of the program SLOs? Identify trends and discuss areas in need of improvement.

Program SLO assessment is performed by questionnaires prepared by the Office of Planning, Research, and Institutional Effectiveness (PRIE). SLO assessment results from Summer 2012-Spring 2014 were all successful (though the number of respondents is very small (4 for Biology AS Degree; 16 for Biology: Pre-Nursing; 12 for Biology: General; 1 for Biology: Biotechnology AS Degree; 2 for Biology:

Biotechnology CS).

4. Describe any additional methods used to assess program SLOs and reflect on the results of those assessments.

No other methods are employed.

5. For any courses in the program that satisfy a GE requirement, which GE SLOs are supported or reinforced by the course SLOs? What do assessment results for the course SLOs reveal about student attainment of the GE SLOs? See **GE SLO Alignment Summary Report** or **All Courses GE SLO Alignment Data**.

With 85 course SLOs that align with the GE SLOS, Biology is one of only five departments (out of 57) to have courses aligned with all 5 of the GE SLOs. Of these 5 departments, it has the greatest number of such aligned SLOs (Real Estate has 56, Kinesiology Theory and Varsity Sports have 69 combined, and Management has 28). The courses taught by the Biology Department therefore have a very strong influence of the GE SLOs of CSM students.

Of these Biology course SLOs, however only 48 SLOs have assessments reported in TracDat, or about 56%. There are 16 course SLOs assessed TracDat that do not match the SLOs reported to align with the GE SLOs. 40 out of 47 (85%) SLOs that align with GE SLO 1 (Effective Communication) are reported to meet success criteria. 24 out of 28 (86%) SLOs that align with GE SLO 2 (Quantitative Skills) are reported to meet success criteria. 51 out of 58 (87%) SLOs that align with GE SLO 3 (Critical Thinking) are reported to meet success criteria. 5 out of 5 (100%) SLOs that align with GO SLO 4 (Social Awareness) are reported to meet success criteria. 1 out of 1 (100%) SLOs that align with GO SLO 5 (Ethical Responsibility) are reported to meet success criteria. In conclusion, although we could be doing much better at assessing a greater percentage of course SLOs, the success in achieving learning outcomes that align with GE SlOs is high (85 – 100%). The number of SLOs that align with GE SLOs 4 and 5 are very low (4% of total alignments). The GE SLO most supported by course SLOs is GE SLO 3 (Critical Thinking).

B. Student Success Indicators

1. Review **Student Success and Core Program Indicators** and discuss any differences in student success indicators across demographic variables. Also refer to the **College Index** and other relevant sections of the **Educational Master Plan: Update, 2012**, e.g., Student Outcomes and Student Outcomes: Transfer. Basic Skills programs should also refer to **ARCC** data.

Student success in Biology courses remains fairly constant: in 2011-2014 success averaged 64%, and retention averaged 80%. Biology success and retention are about 5-6 percentage points below the College values. Both on-campus and online courses in the sciences present somewhat greater challenges for students than non-science courses. This may be why success correlates with age, since maturity is an important "skill" needed for regular and productive study, a key to success in the sciences. Biology faculty continue to pursue approaches that will improve student retention and success, both within the department and division, and with faculty in other disciplines. Of continuing concern is the difference among under-represented groups in Biology compared to the College. Biology Department enrollment by ethnic group roughly parallels the college with Filipino enrollment a few percentage points higher and Hispanic students about 2 percentage points lower. From 2011-2014 the percentage success of Black, Filipino and Hispanic students has fluctuated, and in 2011-2014 Filipino success was 7% lower than the College overall. Hispanic students currently have about 13% lower success rate in Biology than the College overall. Black students, while currently making up less than 4% of the biology students and show almost 20% lower success. The biology and other Math & Science faculty have engaged in discussions concerning the cultural and societal perspectives on science that may be influencing differences in our enrollment compared to the college. Likewise, this is also a reason Biology faculty participate in College committees and professional development activities that investigate ways to improve student achievement.

Biology faculty participate in the Community College Biology Faculty Enhancement through Scientific Teaching (CCB FEST) partnership with SFSU, the State Academic Senate STEM Academy, Leading From the Middle Academy, the Community College Success Network (3CSN) participation in the national Biology Vision and Change Initiative, and participation in AAC&U: Project Kaleidoscope, Ramping Up for STEM Success Initiative, and in the state-wide faculty discipline group developing the Biology Transfer Model Curriculum.

As a way to maintain the quality of our online offerings, the Biology department has an internal policy of requiring STOT or other recognized online training, plus mentoring by experienced distance education faculty. Given the challenges of online teaching, it is essential to have the same quality of instructors as in on-campus courses.

2. Discuss any differences in student success indicators across modes of delivery (on-campus versus distance education). Refer to **Delivery Mode Course Comparison**.

Student success in biology Distance Education (online classes) has a short history of tracking. BIOL 100, BIOL 130 and HSCI 100 are the courses offered both on-campus (Traditional) and online (Distance Ed) that have been tracked for three years. The combined success rate for these three courses (fall semester only) for online sections is 60.8% while traditional sections have a success of about 4% lower. Each online course shows higher success than the paired traditional sections. Retention was higher online for HSCI 100.

The ethnic profile of students taking online courses is about the same as in traditional versions of the same course but the total number of students in some ethnic groups enrolled in online sections is too small to offer a legitimate success and retention comparison with traditional courses. Because of the commitment to the success of all students these data will continue to be tracked. This is one reason Biology faculty participate in College committees and professional development activities that investigate ways to address student achievement.

C. Program Efficiency Indicators. Do we deliver programs efficiently given our resources?

Summarize trends in program efficiency as indicated in the **Student Success and Core Program Indicators** (LOAD, Full-time and Part-time FTEF, etc.)

Biology has very high efficiency, with a LOAD of 687 in 2012-2013 compared to the College LOAD of 533. In 2013-14 Biology percent full-time FTEF was higher than the College: 63.5% compared to 59.2%. Even so, the department continues to struggle to staff high-demand distance education and traditional courses such as Anatomy with a shortage of qualified adjuncts and especially of full-time faculty. With the increasing involvement of Biology faculty in college and district initiatives in the coming year, the need for additional faculty is compounded.

The Biology department is fairly stable in "supply and demand," but is responsive to changes in student need, as well as changes in the College. Demand in some courses has been fluctuating over the past two years, impacting scheduling decisions. For example, enrollments have decreased in BIOL 240 and 260. In Summer 2014 the department did not offer BIOL 240, and in Fall 2014 offered one less section of BIOL 260, to improve enrollments in each course. Enrollments have increased in BIOL 110 and 310. BIOL 110 and 310 serve both general education and major requirements for some transfer programs. The number of online BIOL 310 sections has been increased every semester, and BIOL 110 has added a section Spring 2014 and added another in Fall 2014 as well. Both courses fill all sections easily and can probably fill more sections if they can be staffed.

The table below compares the number and types of sections of Biology courses offered between Fall 2009 and Fall 2014, reflecting changing requirements and student need. If not specified the class is traditional (on-campus). Some courses are only offered in Spring semester, so not all comparisons are shown. For example, BIO 102 changed from one section on campus to one online section Spring 2014, and BIO 310 increased to four online sections Spring 2014.

Course	# sections Fall 2009	# sections Fall 2014
BIOL 100	6 on campus + 1 online	4 on campus + 2 online
BIOL 110	7	8
BIOL 123	1	1
BIOL 126, 127, 128	2	3
BIOL 130	2 on campus + 1 online	2 on campus + 1 online
BIOL 145	1 online	1 online
BIOL 184	1	1
BIOL 195	1	1
BIOL 210	1	2 webassisted

BIOL 220	1	1 webassisted
BIOL 230	1	1
BIOL 240	4	3
BIOL 250	6	6
BIOL 260	3	2 webassisted
BIOL 310	0	3 online
BIOL 329	0	1 new name IDST 102, 104
HSC 100	7 on campus (incl. 1 coastside) + 1 TV + 1 online	1 on campus + 2 online

Biology, Physics and Chemistry departments have coordinated scheduling of Biology major courses so that students will have stable scheduling over several years, and in a way that students can take all of their classes efficiently. Bio majors take a biology and a chemistry class each semester, plus physics and math, in addition to general education classes. With a limited number of sections in these specialize classes, coordination with chemistry, physics, and math is essential for students to complete their transfer requirements efficiently to transfer successfully.

Demand for online courses continues to grow, with every added section filling early. More faculty are learning to teach online courses through district courses (STOT I and II) and approved external courses plus mentoring by experienced Biology faculty, some of whom teach for STOT training. The online biology teachers are meeting the challenges of retention and success that set online classes apart from traditional courses. The Biology department maintains academic standards by requiring training and mentoring of prospective online instructors.

Percentage of full-time classroom teaching FTEF in Biology fluctuates sightly from 2011 to 2014 (fall semesters) around 63.5%, compared to the college full-time classroom teaching FTEF of 59.2% for the same fall semesters. More full-time faculty are needed to achieve college goals of student success, academic excellence and high-quality programs, as well as institutional dialog. In Spring and Fall 2015two full-time Biology faculty will each have release time to work on a District initiative on Distance Education. An adjunct will serve as project manager and the Biology department will have one temporary full-time position, which will be filled by a current adjunct instructor.

3. Career Technical Education

D. Additional Career Technical Education Data - CTE programs only. (This information is required by California Ed. Code 78016.)

1. Review the program's **Gainful Employment Disclosure Data**, **External Community**, and other institutional research or labor market data as applicable. Explain how the program meets a documented labor market demand without unnecessary duplication of other training programs in the area. Summarize student outcomes in terms of degrees, certificates, and employment. Identify areas of accomplishment and areas of concern.

2. Review and update the program's Advisory Committee information. Provide the date of most recent advisory committee meeting.

4. Additional Factors

Discuss additional factors as applicable that impact the program, including changes in student populations, state-wide initiatives, transfer requirements, advisory committee recommendations, legal mandates, workforce development and employment opportunities, community needs. See **Institutional Research** as needed.

1. Distance learning

The Biology department has been at the forefront of distance education for many years. Student success in these courses often matches or exceeds success in face-to-face classes. Biology faculty have long-standing departmental standards for online teaching, mentor new online teachers, participate as STOT trainers, are on the Math/Science Technology Committee. Some courses are currently only offered online (BIOL 102, 145, 310), while some have both on-campus and online sections (BIOL 100, HSCI 100). The number of online sections increases every year as demand grows. For example, while HSC 100 (General Health Science) is no longer a requirement for AA degrees, it remains in high demand, especially the online (distance education) sections. HSCI is a graduation requirement for UCs and the CSUs.

Biology faculty have developed a model Extra-Large Online course (XLO) for Health Science 100. Preparation took place in Fall '14 and the course was offered Spring '15, and is being evaluated for its effectiveness, utility, and sustainability. It is scheduled for Fall '15.

It is difficult to keep up with the demand for online courses. Several online sections remain un-staffed for Fall 2015. More faculty are needed to teach online courses, and while there has been an increase in training of current adjuncts, there is still not enough staff to teach all online sections. Online sections are added every year (In Spring 2015, there were 11 online + 6 web-assisted Biology or Health Science sections). For continued growth of online sections, taught by well-prepared faculty, the department needs more full-time faculty that are qualified to teach online.

Qualifications a faculty member must have to teach an online class in the CSM Biology Department are assessed by current faculty as follows:

1. Formal Training: Successful completion of either “Structured Training for Online Teaching” (STOT I) or the @ONE courses of both “Introduction to Online Teaching and Learning” and “Introduction to Teaching with Moodle” or equivalent training.
2. One semester to Demonstrate use of WebAccess to support a face-to-face class, using of the resources and activities listed below. This qualification is to be coached and assessed by a mentor or mentors of faculty.
3. Proficiency in WebAccess Resources and Activities. The following list is not exhaustive but a basic list to prepare a faculty to teach an online class. Posting content: documents and news; Interactive activities: forums and chats, comments on assignments; Assessments: quizzes and assignments; Record keeping: Gradebook.
4. Ability to communicate online. During the semester of learning and demonstrating proficiency in WebAccess the mentors should monitor and coach the faculty in asymmetric communication and monitoring forums for content and participation and setting up rules for communication such as how fast emails are answered and commenting frequency in forums, assignments, etc.
5. Mentoring. This wasn’t really discussed in detail but I propose two models for mentoring. The one mentor approach and the team mentor approach where several faculty members observe, coach and assess. It was generally agreed that the mentor(s) should be added to the course as non-editing faculty to enable monitoring the courses. Probably, at a minimum the mentor should do a before the semester check in to make suggestions, a check in session about every 4 weeks and a follow up meeting after the semester. Most of the full time faculty seem to think that the team approach will be better because you can pick up more ideas from more people.
6. Class size, online versus face-to-face. Right now the rule at CSM is that online classes are limited to the same enrollment as face-to-face classes.

2. Articulation

Transfer Model Curriculum Course Descriptors have impacted Biology courses in minor ways, and faculty have rewritten course outlines to bring Biology courses into alignment with the anticipated final state descriptors. Changes have included prerequisite or recommended preparation modifications (e.g. eligibility for ENG 100 instead of ENG 848), minor course content additions (e.g. adding Mendelian genetics to BIOL 230 although it is also covered in BIOL 210 and 220). Once implementation of SB 1440 is complete, the Biology department expects students pursuing transfer to the State University system will have a more transparent path. A more strict accounting on the number of units students take before transferring, and a clear listing of chemistry, biology, physics, math, and GE classes students must complete before transferring should expedite transfer readiness as long as students can be accepted to their desired CSU campus. Students pursuing transfer possibilities to the UC system will still have to use ASSIST (assist.org) for more guidance since transfer requirements vary between UCs and programs/majors. Student transfer agreements with UC campuses will not be affected by the implementation of SB1440.

At CSM the Biology courses are strongly articulated with UCs, CSUs, and private universities. As soon as the Biology AS-T is finalized, CSM Biology courses will be submitted for approval. Transfer Model Curriculum Course Descriptors for Anatomy and Physiology are being developed in two tracks. One track would not require any science prerequisite for the courses, while the other track would have science

prerequisites. Currently both Biology 250 and Biology 260 at CSM have science prerequisites. The descriptor draft also requires 80% of the labs be hands-on labs. While this is not an issue for the Anatomy course, Physiology is currently taught as web-assisted with 50% of the lab being taught online. This model may have to be revisited as the descriptor becomes final.

Bio 220 (botany) and Bio 210 (zoology) are only offered at CSM. Revising and submitting our course outlines for COI approval will be straightforward. The college is working on coordinating the TMC with the additional units Biology 210 and 220 add to the degree.

A recent articulation issue with San Jose State, an important transfer institution for College of San Mateo students, has been solved by development of a Human Biology laboratory unit, Biology 132. BIOL130 (Human Biology) will no longer articulate alone because it lacks a lab. BIOL 132 has been approved and will be offered Fall 2015. This lab will be of use to students for general education as well as pre-health preparation. BIIOL 132 may be taken concurrently with BIOL 130 or after its completion.

3. Honors Project

Beginning in Fall 2014, the honors science seminar was offered as an Interdisciplinary course, and the seminar was taught by Biology faculty. The mission of the Honors Project at CSM is to provide opportunities of engagement for students who are among the most academically motivated. The seminar course is paired with a transferable science, technology, engineering or math course, called the “foundation course." Participating students are expected to expand on and deepen the content of their foundation course by developing a project under the theme of the seminar course. The seminar course provides students with a means to make intellectual connections between their own interests and a range of disciplines through the aim of a scholarly dialogue with one another and their professors. The students are provided with the opportunity to present their Science Honors Research Project at the CSM Honors Project Showcase. Future Honors Biology students may do their honors course work using a Biology faculty in a foundation course.

4. Classroom limitations

The department has limits in course scheduling due to the lack of lecture and lab classrooms in building 36. This is especially true in high demand courses with dedicated classrooms. As discussed in 2014 Program Review, limitations are especially found in dedicated lab rooms, such as the shared Anatomy-Physiology lab (36-217), which is the site of the Anatomy & Physiology Lab as well as a lab classroom. Coordination of lab set-up, equipment placement, and other material preparations are complicated by the heavy schedule for room 217. The faculty coordination and cooperation required for the classes and open lab to operate efficiently emphasizes the need for more full-time faculty in the department, especially for Anatomy. As will be discussed in Part V, the department would be interested in participating in interdisciplinary space use in the future building 10-12 Emerging/Innovative Technologies Building.

5. Health Science Department

All Health Science classes except for HSCI 100 were discontinued several years ago due to lack of need and low enrollments. Health Science is no longer a graduation requirement for the College, though it remains a requirement for many transfer programs. Biology faculty teach Biology courses and Health Science courses. There are no faculty who only teach Health Science. Health Science is included in Program Review and all other Biology department research and documentation. Thus it has become clumsy to continue considering Health Science a separate department, with separate data collection, and separate schedule and catalog listing. The department would like to have Health Science merged into Biology, as nutrition (BIOL 310) was done with ease. This will increase efficiency and improve communication with students and staff.

5. Planning

A. Results of Program Plans and Actions

Describe results, including measurable outcomes, from plans and actions in recent program reviews.

In 2014 the Biology department described five plans and actions, as follows:

1-Hire a second full-time Anatomy faculty;

2-Pursue answers and solutions to the building 36 problems of security and temperature regulation;

3-Hire adjunct faculty to help manage the ISC (Integrated Science Center);

4-Continue participation in Reading Apprenticeship activities and promote its institutionalization;

5-Pursue sources of funds to pay more faculty hours in the Anatomy & Physiology lab.

Here are descriptions of results and any measurable outcomes of last year's plans:

1-Hire a second full-time Anatomy faculty:

The department did not get to hire a new full-time Anatomy faculty, so the need is as strong as it was last year. In addition the department has determined an equally crucial need for another full-time faculty hire, in this case for Biology 110 plus a specialty course.

Biology is a diverse field of study, and instructors generally specialize in a few different courses, rather than the entire range of offerings of the department. Adjuncts' loads are almost always maximized, and with their high regard for the College, they will take courses in a more convenient location when it is offered and of course they would be expected to take a full-time position elsewhere. The department is responsive to changing needs of students, and adjusts section offerings accordingly, both in number offered and manner of delivery (on campus daytime, evening, and online). These schedule changes can be met with a solid full-time faculty and are much more difficult to handle with the need to hire and schedule adjuncts, who are limited in units and available times to teach. With an ongoing shortage of full-time faculty and the retirement of an Anatomy/Physiology professor in the next year or two, the Biology department continues to have need for a second new Anatomy position.

The department also has a very strong need for a full-time General Biology (BIOL 110) position, with one other specialty (including cell biology, microbiology, zoology or botany). Serving the first three College Missions (Student Success, Academic Excellence and Responsive, High-quality Programs), the department faculty determined about eight years ago that Biology 110 should be taught by full-time faculty to the greatest extent possible. As a gateway for Health careers and an introductory course for a number of Biology major transfer sequences, as well as the department's landmark General Education course, Biology 110 represents the department to the largest student population. Maintaining consistent quality in seven to nine sections requires the time and services of full-time faculty.

2-Pursue answers and solutions to the building 36 problems of security and temperature regulation:

The College's new Facilities management is very responsive and proactive, and keeps the Math/Science Division informed of ongoing problem-solving. While temperature regulation is still faulty, the knowledge that Facilities is aware and working on the issue is a great improvement over the previous situation. Building security is actively being dealt with by Facilities. Faculty conversations with Facilities staff confirms that they are making efforts to improve indoor and outdoor door closing and locking irregularities. What has not been accomplished is the changeover to electronic (fob-controlled) door locks on the lecture rooms in the building. As the March 18, 2015 lockdown drill emphasized, this seriously compromises security efforts in an emergency. The department continues to request this improvement.

3-Hire adjunct faculty to help manage the ISC (Integrated Science Center):

This did not occur and is no longer requested. At the end of Spring 2015, the current 25% staff who manages much of the ISC duties will retire, and will not be replaced. The other duties have been carried out by a full-time faculty (with no reassigned time except for Fall 2014). The VP of Instruction has approved reassigned time totaling 4 FLC for two full-time Science faculty to manage the ISC. A discussion of this issue can be found in the 2015 Program Review for the ISC.

4-Continue participation in Reading Apprenticeship (RA) activities and promote its institutionalization:

A further discussion of RA activities is in Part I of this document. Institutionalization is currently moot as seven science faculty are part of an RA STEM grant to develop and assess STEM curriculum using the RA framework. The activities associated with this grant begin Spring 2015 and will supplant efforts to institutionalize RA for the near future.

Biology faculty have responded to the college's need for enhancement of student success by taking a proactive role through in-depth development of Reading Apprenticeship skills and Focused Inquiry Groups, as both leaders and learners. Three full-time faculty and four adjuncts have implemented Reading Apprenticeship practices as regular parts of some or all of their Biology classes.

5-Pursue sources of funds to pay more faculty hours in the Anatomy & Physiology lab:

No changes in funding resulted since last year. Spring 2015 had 65 hours of open lab (totaling 4 units). Increased hours available to students could result in higher rates of retention and success in Anatomy and Physiology.

Other outcomes since 2014 Program Review:

Since the Spring 2014 Program Review, the department was able to purchase all requested equipment, including anatomy models and microscope slides to replace or improve slide sets for Biology 110, 210 and 250. Recent additions to the department have included new microscopes in Microbiology (BIOL 240), digital spectrophotometers for biology labs, and computers for Biology classroom use.

B. Program Vision

What is the program's *vision* for sustaining and improving student learning and success over the next three years? Make connections to the **College Mission and Diversity Statements**, **Institutional Priorities, 2013/14-2015/16**, and other **Institutional Program Planning** as appropriate. Address discussion in the Student Learning and Program Data section: SLO assessment results and trends in student success indicators.
[**Note**: Specific plans to be implemented in the next year should be entered in C of the Planning section.
CTE programs must address changes in the context of completion and employment rates, anticipated labor demand, and any overlap with similar programs in the area as noted in D1 and D2 of the Career Technical Education section.]

Full-time, dedicated Biology faculty are the most vital element in the Biology department's commitment to fulfill the College Mission and Institutional Priorities, notably five of the six proposed revised priorities for 2015: Improve student success (especially improving progression through courses and increasing student engagement); Promote Academic Excellence; Develop Responsive High-Quality Programs; Support Professional Development; Enhance Institutional Dialog. The Biology department is deeply invested in learning and applying techniques that can stimulate student engagement in each Biology course, leading to higher levels and rates of successful course completion for all demographic groups. The proportion of the faculty who participate in college committees and initiatives to improve student success, which has been high and yet has increased over the past year, will continue to grow. Outside classroom hours devoted to professional development and curriculum enhancement that contribute to the same goals, also already high, will also grow. For continuing ambitious and productive work and departmental, divisional and College-impacting goals, the Biology department requires more full-time faculty and more professional development support.

Accreditation requirements for SLO assessment, state-mandated collaboration on transfer model curriculum planning, and other institutional requirements are best, and often only, met by full-time faculty contributing to these efforts outside of classroom hours. Adjunct faculty usually lacks campus time or commitment for this extra work.

The department is fortunate to have some adjuncts who are willing to give their time outside of classroom work and in spite of their lack of full-time employment at CSM, but most adjuncts cannot or will not make this sacrifice, and those who do are very desirable hires when other institutions have full-time positions open. The department needs to be able to offer such valuable faculty full-time positions so they may thrive and the College may benefit from their dedication.

Biology success and retention is about 5 percentage points below the College values. Of special concern is the difference among under-represented groups in Biology compared to the College. While age is a factor, Black and Hispanic students have at least 10% lower success and retention in Biology than the College overall. Thus Biology faculty continue to participate in College committees and professional development activities that investigate, test, establish and institutionalize teaching and learning methods that improve student achievement. This includes: participation by several faculty in the Umoja Project, which promotes academic success of African American and Pacific Islander students; a long-term commitment to Reading Apprenticeship training, applications and faculty inquiry groups. (this description shortened because discussed elsewhere).

The Biology department is committed to continued and increasing pursuit of excellence and offerings in online sections of courses as appropriate. The number of online sections will increase according to demand as long as skilled faculty are available to teach them. The investigation into XLO (extra large online courses) undertaken in Fall 2014 and piloted in Spring 2015 by Biology faculty was supported by the Chancellor's office, and this initiative will provide a way of determining if this is a feasible and affordable approach to the demand for such classes.

1. To guide future faculty and staff development initiatives, describe the professional activities that would be most effective in carrying out the

program's vision to improve student learning and success.

Biology faculty have found inspiration and stimulation from working with colleagues in other disciplines as well as fellow Biologists. Continued support for Reading Apprenticeship training, on and off campus, will have an increasing impact on student success. Building upon the success of the 3CSN Leadership Community of Practice Institute last summer, several faculty applied for and were accepted for an RA Community College STEM Network Grant that will fund numerous professional development opportunities in 2015-2016. Faculty have led Reading Apprenticeship workshops at CSM on flex day and luncheon events several times over the academic year 2014-2015, and thanks to this new STEM grant, they will continue to offer innovative trainings. These events provide interdisciplinary discussion and practice, and promote communication between all faculty that attend. They have included student participation in panels in which they relate their experiences with Reading Apprenticeship in their classes. The faculty have also presented at RA workshops on other college campuses, sharing their experiences and growing expertise.

Continued funding is desirable for conferences that help improve success and retention of STEM students, and further train faculty to implement Reading Apprenticeship in science classes. Examples of professional development activities are:

- Online teaching and learning conferences for advanced level training beyond that offered by STOT I and II
- Participation in OEI (Online Education Initiative) workshops.
- Participation in STEM related conferences similar to the February 2013, STEM Academy sponsored by the State Academic Senate
- Participation in Reading Apprenticeship workshops
- Participation in Vision and Change Initiatives
- Participation in CCB FEST at San Francisco State University
- Participation in Project Kaleidoscope professional development and initiatives
- Leadership training and/or grant writing training in order to create STEM success initiatives with external funding
- Networking and participation in community college leadership groups such as State Academic Senate, 3CSN, WestEd, RP Group

2. To guide future collaboration across student services, learning support centers, and instructional programs, describe the interactions that would help the program to improve student success.

The department faculty will continue to work on and expand upon collaborative efforts with the other learning support centers. Alignment of services, and a shared vision for these services helps promote a culture of integrated service for students. Further collaboration with student services to help students receive non-academic support would also enhance student success. We are enjoying the dialogue that RA inquiry has generated across instructional programs, and we hope to continue and expand that dialogue to include reading, writing, quantitative skills, and other non-academic skills such as growth mindset, interpersonal communication, time management, etc.

Therefore Biology faculty will continue their membership in the Learning Support Centers Coordination Committee, including participating in decisions about the Learning Center's functions, and mentoring and collaboration with LC staff in a RA FIG (Reading Apprenticeship Focused Inquiry Group). Biology faculty will participate in management of the ISC. A&P Lab Center faculty will promote faculty staffing and support for more paid hours.

3. To guide the **Institutional Planning Budget Committee** (IPBC) in long-range planning, identify any major changes in resource needs anticipated during the next three years. Examples: faculty retirements, equipment obsolescence, space allocation.

See the Resource Requests section below to enter itemized resource requests for next year.
Leave sections blank if no major changes are anticipated.

Faculty

Faculty: One Biology faculty retired at the end of Spring 2014 and another faculty is expected to retire in 2016 or 2017. Last year's retirement was a General Biology (BIOL 110) faculty and the other is an Anatomy and Physiology instructor. While the department hired one Anatomy full-timer for Fall 2014, a second full-time position has been requested for several years, and is still greatly needed. In addition, a General Biology (BIOL 110) position, with one other specialty (including cell biology, microbiology, zoology or botany) is also greatly needed. Beginning Fall 2015 the ISC will be co-managed by a full-time Biology and a full-time Physics faculty, taking over for the 25% staff who has managed multiple tasks in the ISC.

Equipment and Technology

Continued technological support is needed to improve online course materials, especially updated Camtasia and Dragon licenses for online and web-assisted courses.

Instructional Materials

The department needs eventual cadaver replacement, camera for live projection of cadaver dissection and demonstrations, expanded clicker use and increased provision for loaners by division. Because of a new lab course, Human Biology Lab (BIOL 132) new material will be needed.

Classified Staff

no request

Facilities

Maintenance and replacement of classrooms items including seating, lighting, projector bulbs, shades. General environmental controls--temperature and humidity--are still a major problem in B36. Classroom and lab room doors slam with great deal of noise, interrupting class when students come and go into rooms. Safety and security improvements: electronic locks on lecture rooms; ability to lock doors from inside. In case of a lock down, faculty are not able to lock the classrooms or lab rooms from the inside of the room. Phones in the classrooms and lab rooms were requested in the original building construction requisitions as an important safety feature in case of emergency. During fire and lock down drills, there is no way to hear an alarm inside of classrooms or lab rooms. This is of particular concern in case of a fire; students and faculty could be trapped inside rooms if there is no floor monitor to alert them. Another concern, for security and fire-safety reasons, is that the building's outside doors often do not close completely. It would be of great value to have a general assessment of building 36 security conducted.

Long-term commitment to maintenance of teaching gardens is of critical importance to many biology classes. The teaching gardens on the East side of building 36 are used by several classes, including Biology 100, 102, 110, 184, 195, 210, and 220. [An assessment in 2010 showed that 40% of the classes on campus use the gardens for some class activity or purpose.] The gardens are the only mature habitat left on campus. The gardens have a variety of mature plant specimens representing many phyla and plant families. Some of the specimens are rare, and seeds or plants are not available for replacement. Some of the areas have matured and produce understory bryophyte communities. Students are able to conduct observations and studies of pollinators, birds, and plant morphology, vegetation and tree mensuration studies, phenology (seasonal cycles), and life cycles, in addition to data collection, in the safety of the campus gardens. The teaching gardens are also a source of botanical specimens for many of our biology classes (branches, leaves, flowers, fruits, etc.)

Biology students would benefit greatly from the installation of a new native plant garden next to B36, and this new garden could replace some of the older teaching garden sections that have not been maintained.

In addition, the HSCI 100 and BIOL 310 (Nutrition) courses would benefit from an edibles garden to demonstrate growing healthy vegetables, fruits and herbs. This area could be located with the upgraded Wellness Center as an alternative site, associated with the health programs taught in that building. CSM would follow the trend at almost every school in the county, supporting a demonstration of locally grown produce.

We are enthusiastic about the opportunity to include collaborative workspaces within the new Emerging/Innovative Technologies Building. For example, we propose adding a small, fully automated greenhouse to the new Technology building. This greenhouse will be a living laboratory for all STEM courses, as it will require design and maintenance of climate controls, water recycling, plant specimens, etc. Biology will benefit in that they will be able to grow much needed plant specimens for their courses. Technology and engineering/math will benefit in that they can use the greenhouse a lab for designing solar and water-saving technologies.

We all would like to see workspaces – a “design space” equipped with whiteboards, multi-purpose computer labs, and a “tech shop” to support prototyping – would allow students to work in interdisciplinary teams and extend what they learn in the classroom to more advanced projects. Students would gain hands-on experience as they prepare for internships and transfer. Projects could go beyond what is currently possible in a single course, making it easier to attract support from local businesses and industry. We look forward to working with faculty in other disciplines to develop the physical and curricular infrastructure for this effort.

C. Program Plans and Actions to Improve Student Success

Prioritize the plans to be carried out next year to sustain and improve student success. Briefly describe each plan and how it supports the **Institutional Priorities, 2013/14-2015/16**. For each plan, list actions and measurable outcomes. (Plans may extend beyond a single year.)

Prioritize the plans to be carried out next year to sustain and improve student success. Briefly describe each plan and how it supports the Institutional Priorities, 2008-2013. For each plan, list actions and measurable outcomes. (Plans may extend beyond a single year.)

The most pressing issues for Biology are the needs for more full-time faculty, attention to the physical problems of building 36 (especially temperature and door controls), and funding the ISC staffing concerns.

Plan 1

Title:

Hire second new Full-time Anatomy Faculty

Description

The department continues to be understaffed. One instructor was hired in fall of 2014 but due to expanded online offerings, this instructor is already carrying an overload. The department remains short-handed. Another Anatomy and Physiology instructor will retire in 2016 or 2017. Thus the need for full-time faculty has not been met by the hire of Fall 2014.

Biology is a diverse field of study, and instructors generally specialize in a few different courses, rather than the entire range of offerings of the department. Adjuncts' loads are almost always maximized, and even with their high regard for the College, they will take courses in more convenient locations and of course a full-time position elsewhere. The department is responsive to changing needs of students, and adjusts section offerings accordingly, both in number offered and manner of delivery (on campus daytime, evening, and online). These schedule changes can be met with a solid full-time faculty and are much more difficult to handle with the need to hire and schedule adjuncts, who are limited in units and available times to teach. With an ongoing shortage of full-time faculty and the retirement of an Anatomy/Physiology professor in the next year or two, the Biology department continues to have need for a second new Anatomy position.

Anatomy and Physiology impacted courses that are taken primarily by students preparing for allied health programs, especially nursing, physical therapy and kineseology. There is a need to accommodate the increasing demand of these courses as indicated by long student waitlists, especially in the evening.

Anatomy and Physiology have enacted a number of initiatives to promote student success and retention, including providing the faculty staffed A&P Lab for extra supervised study hours, introducing the Reading Apprenticeship program, maintaining an anatomy website. An additional committed full-time faculty is necessary to continue the development and expansion of these initiatives to promote student success.

Action(s)	Completion Date	Measurable Outcome(s)
Hire full-time Anatomy instructor	2015-2016	Improve retention and success in Anatomy classes; improve readiness of nursing students; contribute to other Biology courses and department work.

Plan 2

Title:
Hire Full-time General Biology Faculty (with one other specialty)

Description
The department has a strong need for an instructor to take on a leadership role for BIOL 110, of which there are over 15 annual sections serving 450 or more students. The department also has a very strong need for a full-time General Biology (BIOL 110) position, with one other specialty (including cell biology, microbiology, zoology or botany). Serving the first three College Missions (Student Success, Academic Excellence and Responsive, High-quality Programs), the department faculty determined about eight years ago that Biology 110 should be taught by full-time faculty to the greatest extent possible. As a gateway for Health careers and an introductory course for a number of Biology major transfer sequences, as well as the department's landmark General Education course, Biology 110 represents the department to the largest student population. Maintaining consistent quality in seven to nine sections requires the time and services of full-time faculty. The department is in the process of interviewing untried, unknown new adjunct faculty (some of whom have not taught before, and most who have not taught Biology 110) to staff several unstaffed sections of BIOL 110 in the upcoming academic year. By hiring a new full-time General Biology position (with one other specialty, including cell biology, microbiology, zoology or botany), we will be able to maintain and increase student success through the coordination and leadership across all annual section of BIOL 110, thus helping the department maintain the high quality of our biology program. General Biology courses have enacted a number of initiatives to promote student success and retention, including providing the faculty staffed ISC for extra-supervised study hours and introducing the Reading Apprenticeship program. An additional committed full-time faculty is necessary to continue the development and expansion of these initiative, and to further promote student success. **Impact on transfer, CTE, and Basic Skills.** An additional committed full-time faculty is necessary to continue the development and expansion of the department's wealth of initiatives to further promote student success.

Action(s)	Completion Date	Measurable Outcome(s)
Hire full-time General Biology instructor (with one other specialty)	2015-2016	Improve retention and success in General Biology classes; improve readiness of biology-majors students; contribute to other Biology courses and department work.

Plan 3

Title:
Building 36 Security and temperature regulation.

Description
The temperature of lecture rooms, lab rooms and the hallways of building 36 varies seemingly randomly from floor to floor, day to day and week to week. Extremes of hot and cold are common all year round, unrelated to outside temperature. The outside building doors often do not close because of strong air currents blowing through the halls. Lecture room doors do not have electronic locks, and none of the classroom doors can be locked from inside. Together these are health and security issues that should be fixed for once and for all. While the importance of this problem seems to be recognized by the college, progress is dangerously slow and it is not clear whether Facilities will be able to improve the function of building 36.

Action(s)	Completion Date	Measurable Outcome(s)
Pursue answers and solutions to the problems of temperature control.	2015-2016	Reliable moderate temperatures in all rooms throughout the building
Pursue funding and planning for electronic locks on lecture rooms and for inside locking mechanisms	2015-2016	Safety drills will show that classrooms may be safely locked without faculty exiting the rooms

Plan 4

Title:
A&P center pay for faculty staffing

Action(s)	Completion Date	Measurable Outcome(s)
Pursue sources of funds to pay for more faculty hours in the A&P Center	2015-2016	Increased hours available to students resulting in higher rates of retention and success in Anatomy and Physiology

6. Resource Requests

Itemized Resource Requests

List the resources needed for ongoing program operation.

Faculty

NOTE: To make a faculty position request, complete **Full-time Faculty Position Request Form** and notify your Dean. This request is separate from the program review.

Full-time faculty requests	Number of positions
Anatomy and one other Biology field: General Biology, Microbiology, Physiology, Cell Biology, or Zoology	1
General Biology Instructor	1

Equipment and Technology

Instructional Material

Human Physiology package (6 each) from Vernier to support the new Human Biology (BIOL 132) Lab section. Approximately $822 each.

Classified Staff

Facilities

For immediate or routine facilities requests, submit a CSM Facility Project Request Form.

Description (for prioritized plans)	Plan # (s)	Cost
Building 36 temperature regulation and door security	2	tbd by Facilities

7. Program Maintenance

A. Course Outline Updates

Review the **course outline update record**. List the courses that will be updated in the next academic year. For each course that will be updated, provide a faculty contact and the planned submission month. See the **Committee on Instruction website** for **course submission**

instructions. Contact your division's **COI representatives** if you have questions about submission deadlines.
Career and Technical Education courses must be updated every two years.

BIOL 110, 130, 145, 184, 230 outlines were updated and approved by COI for the 2013-2014 academic year. The minor changes made to course outlines included edited SLOs, removal of TBA hours, or content adjustments in response to or anticipation of alignment with State Transfer Model Curriculum requirements. It should be noted that the list of course outlines' dates on the College Articulation website is not up to date. The College Articulation website does not list the latest course outlines and dates for all Biology courses. Some courses listed on the College Articulation website have broken links. Biology course outlines are up to date.

Courses to be updated	Faculty contact	Submission month
BIOL 126	Kathy Diamond	December 2015
BIOL 127	Kathy Diamond	December 2015
BIOL 128	Kathy Diamond	December 2015
BIOL 220	Tania Beliz	December 2015

B. Website Review

Review the program's website(s) annually and update as needed.

Faculty contact(s)	Date of next review/update
Theresa Martin	Fall 2015

C. SLO Assessment Contacts

SLO assessment contact for the biology department is Santiago Perez, who is acting as the manager/administrator for SLO assessment.