

Printing date 3/12/18

Comprehensive Instructional Program Review Criteria- 2017/2018

Note to Preparers:

Please complete this form that includes the Program Review criteria for the comprehensive instructional program review. One of the major functions of Program Review is to ensure that all work units of the Evergreen Valley College are aligned with its goals. The college's goals are set forth in its Mission and Strategic Initiatives, which are expressed in the narrative below.

Program relevant data sets are provided- via email- by the campus researcher or the Dean of Research, Planning and Institutional Effectiveness. Please see your Dean if you need additional help.

Additional information, including a submission timeline (**Due December 1st for feedback**) and samples of recent Program Reviews, are available on the college website <http://www.evc.edu/discover-evc/institutional-effectiveness/program-review>. If you have any questions, please feel free to contact any member of EVC's Institutional Effectiveness Committee (IEC).

After your submission to IEC, members of the committee will provide feedback to assist you in preparing a final version. The review committee will consist of IEC members and an optional external reader of your choice. The review committee will make a recommendation and your Program Review will precede to College Council and the EVC President for his/her final approval. Completed/approved Program Reviews will be eligible to participate in resource allocation through the College Budget Committee.

Evergreen Valley College's Mission:

With equity, opportunity and social justice as our guiding principles, Evergreen Valley College's mission is to empower and prepare students from diverse backgrounds to succeed academically, and to be civically responsible global citizens.

Strategic Initiatives:

1. Student-Centered: We provide access to quality and efficient programs and services to ensure student success.
Areas of focus are:
 - Access
 - Curriculum and programs
 - Services
2. Community Engagement: We will transform the college image and enhance partnerships with community, business and educational institutions.
Areas of focus are:
 - Increase visibility
 - Develop strategic partnerships
 - Building campus community
3. Organizational Transformation: We create a trusting environment where everyone is valued and empowered.
Areas of focus are:
 - Communication
 - Employee development
 - Transparent Infrastructure

Department/Program Name: Biology

Year of Last Comprehensive Review: 2011/2012

Year of Last Mini Review, if applicable:

Preparers' Name(s): Jack Baker, Robert Blumenkrantz, May Chen, Alfred Gonzalez, Lisa Hays, Terence Lee, Joaquin Li, Azita Tavana, Janice Toyoshima

Area Dean:

Overview of the Department/Program

1. Provide a brief summary of your program. Please include a brief history and discuss any factors that have been important to the program's development.

The Biology Program began in 1975 with the opening of Evergreen Valley College. Today, we offer a wide range of courses in animal biology, plant biology, human biology, environmental science and oceanography. The staff and faculty in the Biology Program are dedicated to challenging our students with a high quality education. Most of our students are exploring biology for their general education requirements. Many are preparing to enter allied health careers such as nursing and others are planning to major in Biology and transfer to a four year college or university.

The construction of the Sequoia building in 2002 gave the Biology department the opportunity to expand course offerings. Since the past program review we have doubled the sections of anatomy, physiology and microbiology for allied health majors. The building includes a room for anatomy cadaver dissection and an extra lab room for physiology. There is a greenhouse that is, unfortunately, inadequate because of its poor design and lack of an irrigation system. The gem of our building is the Natural Science Museum which holds approximately 300 specimens in glass cabinets for students to view and study. Even the art department visits the museum to draw the animals.

With the additional sections, the Biology department now offers four associate degrees, more than any department on campus. 1) Associate of Arts in Biology 2) Associate of Science Transfer in Biology 3) Associate of Arts in General Studies, emphasis in Natural Science and 4) Associate of Arts in general Studies, emphasis in Health Science. The contribution of the four degrees to the total number of degrees offered by the college, the number of degrees awarded by the college, and the number of students graduating are significant factors in determining a college's success.

The Biology faculty and staff are committed to creating a safe, encouraging, but challenging learning environment open to all students regardless of gender, race, ethnicity, or culture. Our three academic pathways (non-major transfer, major transfer & allied health preparation) provide all students with appropriate options for their individual interests. Each Biology faculty member spends generous amounts of time with students to clarify coursework, serving as role models, offering educational and career advice, and preparing letters of recommendation.

2. Please provide an update on the program's progress in achieving the goals (3 years) set during the last comprehensive program review.

Our first goal was to increase the diversity of course offerings in the department. We have since added Forensic Biology and an online version of Plants and Human Welfare. Our second goal was to reinstate the field courses which were completely cut due to budget restraints. Those are slowly coming back into our schedule with Coastal California, Death Valley, Forest and Rivers, Zion National Park and Lassen National Park. The faculty is updating the curriculum for the field courses so that students may take multiple courses. Previously this was prevented by limits on repeatability because the various courses were offered under a single course designation. Finally, multiyear programming was a goal that is only now beginning with a yearly schedule. This schedule will allow students to get a degree at night and weekends in addition to daytime hours.

Another goal was to replace old and broken technology and equipment. The department received funding based on the previous program review to purchase several items desperately needed. New laptops and hardware/software called BioPACs were purchased for the physiology lab. Several new anatomical models were purchased for anatomy labs and older models were donated to the biology skills lab for students to practice. Microscopes were purchased to replace the 40 year old set in the biology majors' laboratory.

Two years ago the department was granted one of the few full-time hires allowed for EVC. Terence Lee was hired to specialize in anatomy and general biology. This brought the total full time faculty members up to 7 after 40 years of just 6. Still, too much of the instructional load is carried by adjunct faculty members who, despite their talents as instructors, cannot and should not be expected to meet all the duties expected of full-time faculty members. The increase in the number of degrees, courses, and sections offered by the department coupled with the growth in student demand for classes has created the need for an additional full-time faculty hire in biology. In addition, the department will need to hire new full-time faculty members to replace retirements expected in the next few years. The department has a documented need for at least 8 full-time faculty members.

3. Please state any recent accomplishments for your program and show how it contributes to the College's mission and success.

Since the last program review for the Biology Department, the Associates in Science Transfer – Biology degree was developed and approved by the college, the district, and the State Chancellor's Office for California Community Colleges.

In 2014-'16, Al Gonzalez applied on behalf of EVC & Biology and was selected as one of 12 community Colleges in California to participate in the California Space Grant Consortium Arduinos Fellowship.

The program was a two-year pilot program that was designed to enhance STEM preparation at 12 California Community Colleges and improve a bridge opportunity for 300 students (140 students in year one, 160

students in year two) to either the University of California or the California State University system. The 20 students (over two years) participating from EVC were awarded a \$750 stipend, Arduinos Team Projects, two field trips to NASA, participation in an on-line Arduinos course, Nasa webinars, poster presentations & internships. All twenty students completed the fellowship opportunity.

These student activities align with a few of our mission statements: academic and occupational instruction at the lower division level, workforce improvement, distance learning opportunities.

4. Please describe where you would like your program to be three years from now (program goals) and how these support the college mission, strategic initiatives and student success.

The Chancellor is asking us to increase our offerings at night and on the weekends to accommodate our students. Our first goal is to receive funding for an 8th full time faculty member. General Biology, BIOL 021, has grown to be our largest course in terms of the number of sections offered and the number of students served. It is the department's highest demand GE course and is a prerequisite for human anatomy (and by extension, human physiology and microbiology for those students focused on nursing or other careers in the health sciences). Unfortunately the department has been forced to offer the vast majority of the sections in this course with adjunct faculty members, the majority of whom are gifted teachers but are nonetheless unavailable or unable to take care of the any faculty duties and responsibilities that occur outside the classroom. Assessing SLOs and coordinating 13 different lab sections each semester has become a challenge with so many sections taught by adjunct faculty members.

The reliance on adjunct faculty members has become an ever more pressing problem for the department. For fall and spring 2015, there was load enough for 13.5 full-time faculty members in a department of seven. Well over half of the instruction in biology is now handled by adjunct faculty members. Yet, many of the courses offered require special skills and laboratory experience, and it is often difficult to find adjunct faculty members who can effectively teach these subjects.

In three years from now we expect two faculty retirements from our department. Just as we were starting to reach our goal of 8 full time faculty members, we will be dropping again. The Student-Centered Initiative has three areas of focus: access, curriculum and programs, services. To keep up with curriculum and program needs, the department needs 8 full time faculty members. For the safety of our students and quality of our program, it is important to keep full time faculty members leading and coordinating the multiple laboratory courses. Moreover, faculty responsibilities extend beyond the classroom and can only be met, should only be expected of, full-time faculty members. Additionally, to grow our night and weekend offerings, we need a complete department of full time faculty members to teach and manage those courses, and a corresponding increase in staff support.

In three years from now the department would like to see the Biology Skills Lab hours increased to accommodate our afternoon, night and weekend students. The Biology Skills Lab is directly linked to EVC's first strategic initiative: Student-Centered: We provide access to quality and efficient programs and services to ensure student success. Students who visit the Biology Skills Lab spend time studying with the right tools and guidance from the Instructional Assistant. The lab includes many of the same plastic models that

students use in their laboratory classes as well as charts, computer software, and microscopes with slides. The Biology Skills Lab also hosts space for the biology tutors to meet with students. The limited hours of 8:30AM-3PM Monday through Friday only allows morning students to visit. An afternoon/evening student who wants to visit before or after class would want to come around 5PM yet the Skills Lab is closed. Years ago the Skills Lab was open on Saturdays before anatomy exams and those times were heavily used by students wanting extra study hours. The department would like to bring those hours back.

The department uses space on the 2nd floor of the Sequoia building to provide a Biology Skills Lab that is open 30 hours/week for student study time. The original room and attached office space were specifically designed for the Biology Skills Lab Instructional Assistant to watch students at work through a wall of glass windows and a Dutch door that allowed easy communication with students. Those rooms, S-202 and S-204 are now being used by the nursing department for HiFi. The Skills Lab was moved to a much smaller conference room, S-219, that lacks the attached office with windows to monitor student use of the Skills Lab material. For those not familiar with pricing of biology models, a plastic cell model costs \$900 and a torso model is \$5,000. It is important that the Instructional Assistant have a space to keep models stored safely and be able to watch students at work. The department would like to request a remodeling of S-219 to bring back the office space for the Instructional Assistant. Eventually, it would be best to find a space similar to what was used for the past 15 years.

From 1975 when EVC opened, the Biology Instructional Supply budget was \$9000. For most of the past 35 years the instructional budget was \$13,000. For a few years in the early 2000's it increased but by 2010 it was back to \$13,000. Every year the department has to plead for extra funds to cover the costs of buying supplies for the expensive lab courses. We now offer 75 lab classes each year and yet we work with a minimal budget. This prevents us from improving courses and buying modern equipment for our students who plan on working in a high tech world. The cadavers for anatomy alone cost \$6,000 and every 2 years we struggle to find the money to pay for this essential part of our pre-nursing classes. The Biology Department will never be able to use the words State-of-the-Art unless we increase our instructional supply budget to at least \$40,000. The key for us to get this budget permanently approved so we can rely on a steady \$40,000 each year.

Additional funding is also needed to open the Biology Department's Natural Science Museum for visitors. The museum is home to about 300 species of animals from a variety of geographical areas in the world, including as far as Africa. Azita Tavana is working hard to update each specimen's identification card and including QR codes. At present there is no budget for the museum to preserve and maintain its many specimens, and the department's already inadequate budget should not be expected to absorb these expenses. In the near future, we would like to be able to open the Natural Science Museum to the public and we will need funds to advertise and to staff the museum during open hours.

Our last goal is to increase the number of and properly upgrade the classification of our laboratory technicians. To offer more night and weekend sections, the faculty needs the support of an additional part-time laboratory technician like our colleagues at SJCC. It's not uncommon to run out of solutions and supplies at 8PM in the middle of an important night laboratory. Without a lab technician, it is difficult to make a laboratory class run smoothly. Adjunct faculty members, especially, have trouble since they are often unfamiliar with the stockroom and storage areas. Even full time faculty members often don't know where all of the supplies for their courses are stored.

The biology department lead lab technician was hired 22 years ago and today the number of lab courses has more than doubled. We now offer 75 lab classes per year. Originally the Lab Tech IV position was enough to manage the ordering of supplies, preparation of solutions and materials, and setting up student labs. This job description is no longer applicable for the size of the biology department. Like SJCC which has the same size operations as EVC, it is time for us to upgrade the position to a Lab Coordinator.

Looking at the two job descriptions, the department needs these additional skills which go above and beyond a lab tech:

Administrative

- Track budget and accounts
- Coordinate workload of lab techs
- Schedule, maintain and oversee the use of:
 - Computer room
 - Natural science museum
 - Greenhouse
 - Garden
- Recommend hiring student employees; hire, schedule, train and supervise student help
- Identify part time staffing needs
- Establish and maintain program standards for tutors and students
- Collect and compile data and report for program activity
- Assist the Dean with preparation and administration of budgets governing the program and make budget recommendations

Knowledge of

- Laboratory management techniques including staff scheduling, project planning
- Hiring, interview, and selection techniques
- Student learning styles and learning disabilities

The department was asked how the lab coordinator is different from what Robert does now. Robert does a few of the duties listed in the lab coordinator position, but the next technician isn't required to do those duties if it's not in their job description. Robert does NOT do many of the duties listed above.

Finally, the lab coordinator position includes 12 month coverage of the biology labs. Having a coordinator on campus will allow surveillance of equipment and materials to ensure safety of the biology classrooms year round. One year we had a leak in the ceiling that went undetected for weeks.

Preparation for spring and fall can happen earlier if there is a coordinator on campus. We could offer a lab class during intersession which we've never done due to lack of staffing.

Even the little things, watering the plants in the greenhouse and feeding fish in the aquarium, cannot be performed for 5-6 weeks during winter break. This prevents the department from expanding our live specimen collections. A year round coordinator would keep our program alive during the times that a lab tech is not working.

PART A: Program Effectiveness and student success- please note that the Excel data workbook you received from the Research Office will be needed to complete this section. With each of the data elements, the underlined header corresponds with the name of the tab on the data spreadsheet to indicate where you will locate the data.

1. Program Set Standards (Summary Tab)

Overall, EVC’s Institution Set Standard for success rate is **64%**, and the aspirational goal for student success is **71%**

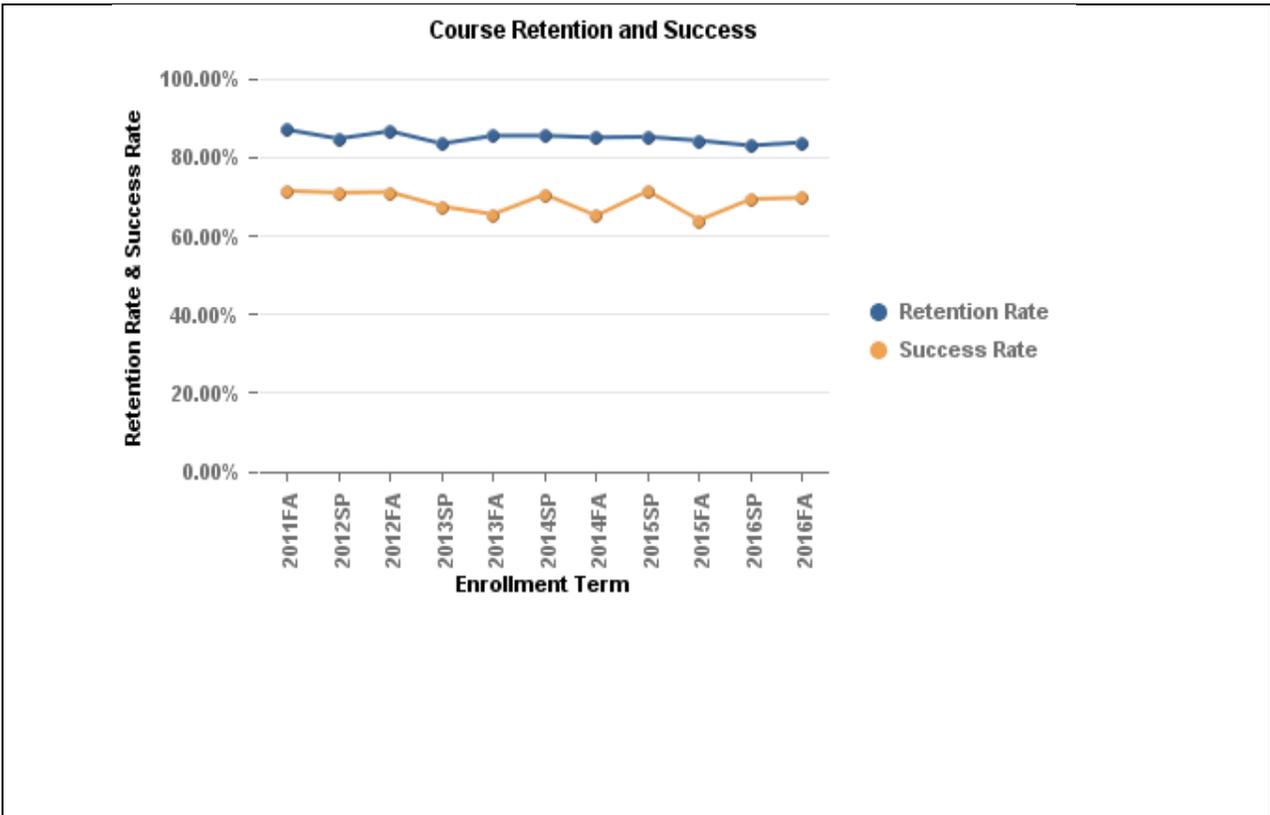
| <u>Success Rate</u> (completion with “C” or better) | Program | EVC | Program Set Standard (established during last comprehensive PR) | Program Success Goal (new) |
|---|---------|--------|---|----------------------------|
| F’11-F’16 average | 68.72% | 71.23% | 61.85% | 71% |

Program Set Standard: It is recommended that programs identify a success standard. This standard should reflect the *baseline* success rate.

Recommendation: 90% of the 5 year average success rate could be your program standard (average x 0.9).

Program Success Goal: It is recommended that programs identify a success goal. This goal should reflect the success rate to which your program *aspires*.

| | |
|---|----------------|
| a) Is your program success rate higher or lower than the campus? | Lower (-2.51%) |
| b) Is your success rate is higher than the campus, how are you helping students succeed in and outside the classroom? If your program success rate is lower, what are some strategies your program is implementing to improve? Our department has designated lead instructors for each biology course. Lead instructors create recommended syllabi and schedules for all sections of the course to standardize course content. Additionally, our department regularly reviews our Student and Program Learning Outcomes in order to identify weaknesses and improve course materials. Finally, our department faculty members participate in Early Alert in order to identify students who may need additional tutoring for our courses. Biology Department Average Course Retention and Success Rates (2011-2016): | |



c) Is the current program success rate higher than the program set standard?

Higher (+6.87%)

d) How close is the program to meeting the program success goal?

Very close (2.28% from goal); Our success rate fluctuates from semester to semester. Although our average is slightly lower, we have met our goal several times within the past 5 years.

e) Are these measures (program set standard and program success goal) still current/accurate? If not, please describe here and reset the standards.

Yes

2. Success Rate ("C" or better)-average F11- F16

| | Program (average total enrolled students/Success Rate) | EVC |
|--|--|---------------------|
| <i>Success Rates: Measures by IPEDs</i> | | |
| American Indian | 36/74.89% | 110/ 75.6% |
| Asian | 4035/73.39% | 9,599/ 77.2% |

| | | |
|---|--|----------------------|
| Black or African American | 263/ 58.66% | 661/ 60.4% |
| Hawaiian/Pacific Islander | 74/ 58.83% | 131/ 65.4% |
| Hispanic | 3706/ 63.73% | 8,890/ 64.6% |
| Two or More Races | 253/ 68% | 562/ 67.5% |
| Unknown | 642/ 66.35% | 2,210/ 74% |
| White | 751/ 74.03% | 1,623/ 74.4% |
| | | |
| <i>Success Rates: Measures by Gender</i> | Program (average total enrolled students/Success Rate) | EVC |
| Female | 6102/ 69.19% | 12,535/ 72.9% |
| Male | 3642/ 67.93% | 11,195/ 69.4% |
| No Value Entered | | 60/ 78.9% |
| | | |
| <i>Success Rates: Measures by Age</i> | Program (total enrolled students/Success Rate) | EVC |
| 17 & Below | 91/ 81.42% | 512/ 79.6% |
| 18-24 | 2007/ 66.75% | 15,569/ 68% |
| 25-39 | 2309/ 73.43% | 5,012/ 74.7% |
| 40 & Over | 352/ 75.90% | 2670/ 82% |
| Unknown | | 12/ 74.6% |

- a. With respect to success rates, how are your program success rates similar to or different from the rest of the campus? What equity gaps have you identified?

The biology program success rates are about 1.5-3.7% less than the rest of campus (see measures by gender). Our program is lower in almost every category except for 17 & below (+1.82). The largest discrepancies are Unknown Race (-7.65%, n=642), Hawaiian/Pacific Islander (-6.57%, n=74), 40 & Over (-6.1, n=352), Asians (-3.81%, n=4035), and Women (-3.7%, n=6102).

- b. If equity gaps for success are identified, what interventions will be implemented in the program to address these equity gaps? Please include a timeline of implementation and reassessment.

To address the equity gaps and to help all biology students succeed, the department recommends adding more hours to our Biology Skills Lab to meet the needs of afternoon, night and weekend students. We are fortunate to have a space just for students to study biology but it needs to be open for more hours. The Biology Skills Lab is currently open 8:30AM – 3:00PM. Staying open until 6PM would allow more students access to the tutoring, models and computers of the Biology Skills Lab. Adding hours to the Math Science Resource Center would also help these students.

Adjunct faculty members get paid for only 30 minutes of office hour for each 0.20 of class loading. 30 minutes of office hours per week per three-hour lecture course is not adequate and does not serve their students. Adding more paid office hours to adjunct salaries would allow them to stay more often with students for tutoring.

We will continue to reassess every 2 years.

c. With respect to disaggregated success rates (ethnicity/race, gender and age), how did the students do in reaching your program set standard for student success? How about reaching the program success goal?

Most ethnicities/races met EVC's Institution Set Standard of 64% except for Black or African American (58.66%) and Hawaiian/Pacific Islander (58.83%)

Three ethnicities/races met the aspirational goal of 71%. They were American Indian (74.89%), Asian (73.39%), and White (74.03%).

Both Female and Males met the Institution Set Standard for success rate is 64%. Neither met the aspirational goal for student success is 71%, Female (69.19%) and Male (67.93%).

All age groups met the Institution Set Standard for success rate is 64%. All age groups except for 18-24 met the aspirational goal for student success is 71%. The 18-24 age group scored 66.75%

d. If your program offers course sections fully online, please contact the EVC Dean of Research, Planning and Institutional Effectiveness to get a student success report on the online sections. Then discuss the success of fully online sections verses face to face sections.

The Biology department offers two fully online classes, both taught by Lisa Hays. Oceanography (OCEAN 010) was originally a TV course and became an online course in 2011. EVC does not offer Oceanography on campus, so for comparison the online EVC class was equated to the SJCC face to face section. The EVC success rate between 2011-2016 was 59.97% and the SJCC success rate between 2011-2016 was 61.58%. There is very little difference between the online and face to face courses.

The other course taught online is Plants and Human Welfare (BIOL 062). It is usually offered on campus each spring semester at EVC and the average success rate in the past 5 years was 68%. Plants and Human Welfare was offered online for the first time in Fall 2016 and the student success rate was surprisingly high at 86%. It is being offered for the second time this fall 2017 and already the student success looks to be high once again. Lisa Hays teaches both the online and face to face classes so this should be a good comparison between the two methods of teaching.

Oceanography and Plants and Human Welfare are taught in almost identical ways since Lisa Hays offers them both. It is curious that the success in the Biology class is so much higher than the Oceanography class. This deserves to be further investigated at the end of the fall 2017 semester.

3. Program Awards- if applicable

If the classes in your program lead to a degree or certificate, please visit DataMart and indicate how many degrees/certificates were awarded in your program: http://datamart.cccco.edu/Outcomes/Program_Awards.aspx You will need to select drop down menus as shown below and then “select program type by major of study” (for example, select Legal for paralegal studies).

Then at the bottom of the report, select the box “program type- four digits TOP”, then update report to get program specific information.

| Degree Type: | Number of Awards (2015-2016) |
|-------------------------|-------------------------------------|
| AA | 2 |
| AS | |
| AS-T | |
| AA-T | |
| Certificate 12-18 units | |

Discussion: Department needs help finding numbers for all four degrees. This website only shows AA-Biology. Our most popular degree is the General Studies with an Emphasis in Health Sciences but no data on Datamart.

4. Student Enrollment Types (average F11-F16)

| <i>Day or Evening Student</i> | Program average Headcount | Pct of Total | EVC- average Headcount/Pct Total |
|-------------------------------|---------------------------|--------------|----------------------------------|
| Day | 390.4 | 45% | 4,106/ 46.3% |
| Day & Evening | 434.0 | 50% | 3,486/ 39.2% |
| Evening | 41.2 | 4.8% | 1,116/ 12.6% |
| Unknown | No info | No info | 171/ 1.9% |

| <i>Academic Load</i> | Program average Headcount | Pct of Total | EVC average Headcount/Pct Total* |
|----------------------------------|---------------------------|--------------|----------------------------------|
| Full Time | 400.9 | 46.3% | 3,102/ 34.6% |
| Half Time or less than half time | 229.7 | 26.5% | 5,797/ 64.8% |

*Note: No reported here are overload/withdrawn to equal 100%

5. Student Demographics- Headcount (average F11-F16)

| Program Total Headcount | | Pct change year to year | |
|---|------------------|-------------------------|--------------------------------|
| Gender | Headcount | Pct of Total | EVC Headcount/Pct Total |
| Female | 994 | 62.8% | 4,776/ 53.8% |
| Male | 590 | 37% | 4,082/ 46% |
| No Value Entered | 3 | 0.05% | 24/ 0.3% |
| Age | Headcount | Pct of Total | EVC Headcount/Pct Total |
| 17 & Below | 28 | 1.65% | 436/ 4.9% |
| 18-24 | 1153 | 72.6% | 5,358/ 60.3% |
| 25-39 | 353 | 22% | 2,091/ 23.5% |
| 40 & Over | 56 | 3.6% | 994/ 11.2% |
| Unknown | 0 | 0% | 9/ 0.10% |
| IPEDs (Race Ethnic Classification) | Headcount | Pct of Total | EVC Headcount/Pct Total |
| American Indian | 6 | 0.36% | 42/ 0.47% |
| Asian | 655 | 41.4% | 3,546/ 40% |
| Black or African American | 43 | 2.7% | 260/ 2.9% |
| Hawaiian/Pacific Islander | 12 | 0.74% | 50/ 0.56% |
| Hispanic | 608 | 38% | 3,413/ 38.4% |
| Two or More Races | 41 | 2.5% | 207/ 2.3% |
| Unknown | 104 | 6.4% | 741/ 8.4% |
| White | 121 | 7.6% | 622/ 7% |

- a. Did you notice any changes in **program enrollment types** (day vs evening, full-time vs part-time) since your last program review? How do your program enrollments (Pct of total) compare to EVC? Based on the data, would you recommend any changes?

Annual student enrollment remained pretty consistent between 2011-2016 (average of 1,436 students/year). There was a slight dip in enrollment in spring 2012 & 2016, which was probably influenced by the “uncertainties” of the national presidential election period. This would include market instability, the status of AB540 students, increased employment opportunities and many 1st generation college enrolled students.

Day student enrollment comprised 45% of students, while evening student enrollment comprised 4.8%. 50% of students are enrolled in a combination of day and evening courses. Full-time student enrollment comprised 46.3% and half-time and or less than half-time student enrollment comprised ~26.5%.

Biology program changes have been implemented to accommodate the maximum capacity of students that the program can sustain. These include more evening and weekend course offerings. Increased A.S., A.A. and certificate offerings. Ultimately, the program needs at least two additional full-time faculty members (currently have 7 full-time faculty).

b. Based on the **program total headcount** and Pct change year to year, is the program growing or declining? If so, what do you attribute these changes in enrollment to and what changes will the program implement to address them?

The biology program is growing. This growth may be attributed to recent faculty hires that instruct the additional non-science major courses offered. Second, increased population in the Silicon Valley as a result of employment opportunities is increasing student enrollment at EVC. The institution focus on student pathways includes improved student guidance and expanded course offerings in the biology program.

c. What gaps have you identified in your program? How is your program enrollment similar or different from the campus? Which gender, age, and/or ethnic group are proportionally smaller than campus make up?

The greatest gaps in the biology program are the unavailability of lecture rooms, insufficient funding, too few full-time faculty members, and inadequate lab technician support. There seem to be more females than males attending courses in the biology department, however, the enrollment reflects that of the college. The two primary ethnic groups are Asian and Hispanic students. African American, White, and Native American groups are proportionally smaller.

d. Based on your findings, what interventions can the program implement to address any gaps in enrollment?

To repeat our recommendations in part 2.c. the department recommends adding more hours to our Biology Skills Lab, adding hours to the Math Science Resource Center, additional paid office hours for adjunct faculty, hire and maintain a full-time faculty of 8, reclassify our lead laboratory technician position, and hire additional laboratory support staff.

Regarding the gaps in male vs female enrollment, historically there has been a lower enrollment of men in the biological sciences. EVC needs to increase outreach to local high schools and share our offering of four biology degrees. A side note is that EVC lacks the sports teams and intermural programs like SJCC that often draw males to the college. The college should look at this as an area to increase the enrollment of men at EVC.

6. Institutional Effectiveness (5 year average, see Summary Tab)

| | Program | EVC |
|-------------------------------|---------|-------|
| <i>Capacity</i> | 89.45% | 77.6% |
| <i>Productivity (goal 16)</i> | 17.16 | 15.65 |

| | |
|--|------------------|
| Is your capacity rate higher or lower than the campus? | Higher (+11.85%) |
| Is your productivity goal higher or lower than the campus? | Higher (+1.51%) |

If the program capacity and/or productivity is lower than the campus, please provide rationale:
 Our average program capacity and productivity are both higher than the campus (2011-2016):

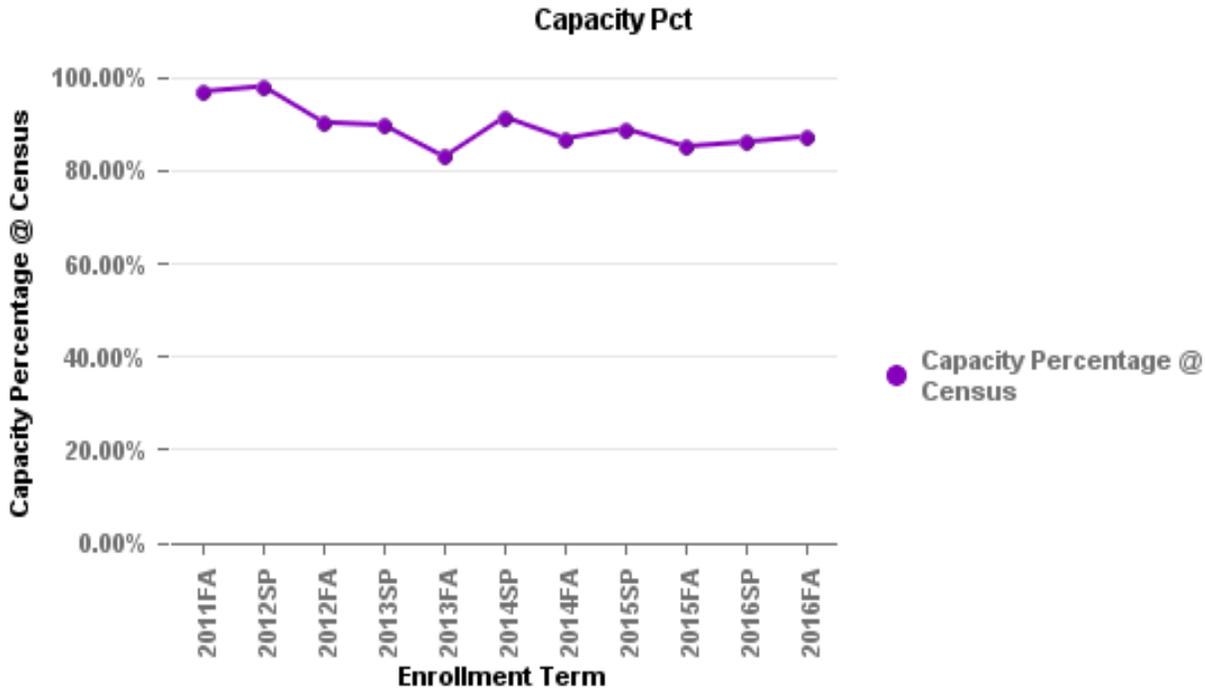


Figure 6.a. Capacity percentage at census date in the past 6 years.

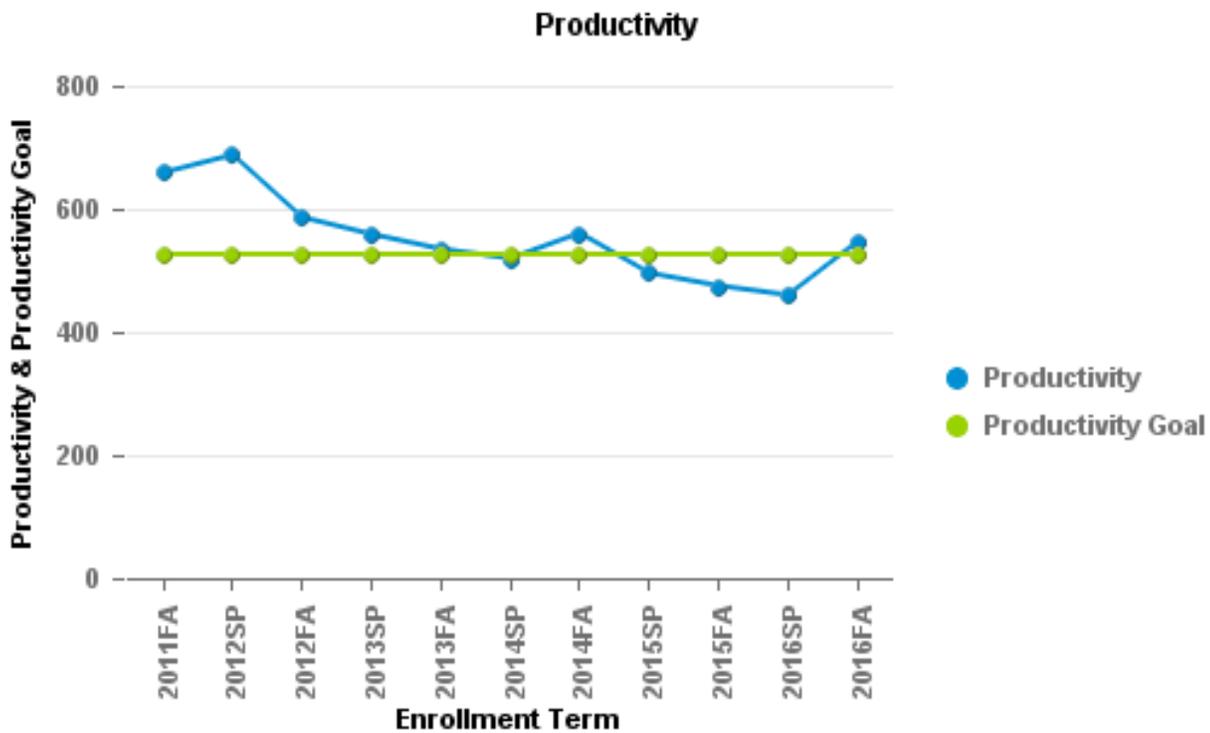


Figure 6.b. Department productivity vs EVC goal for the past 6 years.

PART B: Curriculum

1. Identify any updates to curriculum since the last comprehensive program review, including any new programs and indicate the 6 year timeline for scheduled course outline revision.

In the table below (Table B.1.a) are identified all the courses offered by the Biology Department. The data are currently found in the EVC CurriUNET curriculum database. Of the seventeen courses listed, thirteen have been updated or revised since the last program review. The remaining five courses will need to be updated in the current academic year. Please note that the next review date is approximately five years in the future, to take into account the time needed for departmental review of the course outlines and to allow for the course outlines to move through the curriculum process. The impending implementation of scheduling courses for the entire academic year necessitates shortening the time between revisions to ensure the courses offered are continuously up-to-date.

Table B.1a. List of active courses offered by the Biology Department

| Course Number | Course Title | Last Revision Date/ Implement Date | Next Review Date |
|---------------|-------------------------------------|---------------------------------------|------------------|
| BIOL 004A | General Principles and Cell Biology | 12/10/2015 | 2020-21 |
| BIOL 004B | Organismal Biology and Biodiversity | 05/14/2015 | 2020-21 |
| BIOL 020 | Human Biology | 05/14/2013 | Fall 2018 |
| BIOL 021 | General Biology | 02/26/2015 | 2020-21 |
| BIOL 025 | Forensic Biology | 02/23/2012 | 2017-18 |
| BIOL 033 | Biotechnology and Society | 05/19/2016 | 2021-22 |
| BIOL 061 | Human Heredity | 04/06/2017 | 2022-23 |
| BIOL 062 | Plants and Human Welfare | 12/10/2015 | 2020-21 |
| BIOL 063 | Ecology | 10/27/2016 | 2020-21 |
| BIOL 064 | Marine Biology | 02/26/2015 | 2020-21 |
| BIOL 065 | Wildlife Biology | 12/12/2013 | Fall 2018 |
| BIOL 071 | Human Anatomy | 02/26/2015 | 2020-21 |
| BIOL 072 | Human Physiology | 12/10/2015 | 2020-21 |
| BIOL 074 | General Microbiology | 02/26/2015 | 2020-21 |
| BIOL 080 | Biology Field Program | 03/10/2009 | Fall 2017 |
| BIOL 080A | Field Biology – Zion National Park | 04/14/2015 | 2020-21 |
| ENVIR 010 | Environmental Science | 09/16/2016 | 2020-21 |
| OCEAN 010 | Descriptive Oceanography | 10/08/2013 | Fall 2018 |

Compiled by Janice Toyoshima on 10/03/2017; updated 10/05/2017

In March, 2017, a C-ID course descriptor for environmental science (Introduction to Environmental Science, C-ID course ENV5-DTST 100) was approved and made available. In comparing the C-ID course descriptor to the existing course outline for ENVIR 010, it should be relatively easy to adapt the ENVIR 010 course to match the requirements

for ENVS 100. This would increase the number of C-ID courses offered by the department (see Table B5.b). In the same month a Transfer Model Curriculum (TMC) for an Associate In Science-Transfer (AS-T) degree in Environmental Science was approved. The table below (Table B.1b) identifies the courses offered by EVC that already have C-ID approval and two new courses that would have to be created in order to offer all the courses in the TMC program in Environmental Science. Development of this degree would increase the number of degrees offered by the Biology Department from four to five.

Table B.1b. EVC courses in the Environmental Science TMC

| EVC Course | C-ID Designation | Units | Comments/Notes |
|-------------------|---|--------------|--|
| BIOL 004A | BIOL 190 Cell & Molecular Biology | 4 | |
| BIOL 004B | BIOL 140 Organismal Biology | 4 | |
| CHEM 001A | CHEM 110 Chemistry for Science Majors I, with Lab | 5 | |
| ENVIR 010 | ENVS 100 Intro to Environmental Science | 3 | Would need to be revised to match C-ID course descriptor for ENVS 100 |
| GEOG 100 | GEOG 110 Physical Geography | 3 | |
| GEOG 100L | GEOG 111 Physical Geography Lab | 1 | Need to create new course to match C-ID course descriptor for GEOG 111 |
| MATH 063 | MATH 110 Introduction to Statistics | 3 | |
| MATH 071 | MATH 210 Single Variable Calculus I | 5 | |
| ECON 010B | ECON 201 Microeconomics | 3 | |
| PHYS 004A | PHYS 205 Calculus-Based Physics for Scientists & Engineers: A | 4 | |
| PHYS 004B | PHYS 210 Calculus-Based Physics for Scientists & Engineers: B | 4 | |

Compiled by Janice Toyoshima on 10/24/2017

The following table (Table B.1c) identifies the programs associated with the Biology Department. The data are currently found in the EVC CurricUNET curriculum database. Two of the programs listed (AA General Studies with emphasis in Natural Science and AS-T Biology) were updated and created, respectively, within the past two years. The AA General Studies with Emphasis in Health Science degree is currently being revised. The AA Biology degree will need to be reviewed and revised during the current academic year.

Please note that the next review date is approximately five years in the future, to take into account the time needed departmental review of the program outlines and to allow for the program outlines to move through the curriculum process. The impending implementation of scheduling courses for the entire academic year necessitates shortening the time between revisions to ensure the programs offered are continuously up-to-date.

Table B.1c. Degree programs offered by the Biology Department

| Degree Program | Program Title | Last Revision Date/ Implement Date | Next Review Date |
|----------------|---|--|-----------------------------|
| AA | Biology | Created prior to 2014 (State control number 18991) | Start revision? |
| AA | General Studies with Emphasis in Health Science | Created prior to 2014 (State control number 18693) | Currently under revision |
| AA | General Studies with Emphasis in Natural Science | Fall 2017 (State control number 18695) | Fall 2022 |
| AS-T | Biology | Implemented 06/16/2015 (State control number 35478) | Fall 2020 |

Compiled by Janice Toyoshima on 10/03/2017

2. Identify all the courses offered in the program and describe how these courses remain relevant in the discipline and real life experiences for students. Please include the list or diagram (program major sheet) of the courses reflecting course sequencing in the major and how often the courses within the program have been offered.

In the table below (Table B.2a) are listed the courses offered by the Biology Department with brief descriptions of relevancy in the discipline.

Table B.2a. Courses offered by the Biology Department with descriptions of relevancy

| Course Number | Course Title | Relevancy in the discipline and real life experiences |
|---------------|-------------------------------------|---|
| BIOL 004A | General Principles and Cell Biology | Part of TMC in AS-T Biology degree |
| BIOL 004B | Organismal Biology and Biodiversity | Part of TMC in AS-T Biology degree |
| BIOL 020 | Human Biology | Fulfills requirement for GE science with lab (life science) |
| BIOL 021 | General Biology | Fulfills requirement for GE science with lab (life science); prerequisite course for BIOL 071 |
| BIOL 025 | Forensic Biology | AA/AS applicable; transfers to CSU and UC |
| BIOL 033 | Biotechnology and Society | AA/AS applicable; transfers to CSU and UC |
| BIOL 061 | Human Heredity | Fulfills requirement for GE science (life science) |
| BIOL 062 | Plants and Human Welfare | Fulfills requirement for GE science (life science) |
| BIOL 063 | Ecology | Fulfills requirement for GE science (life science) |
| BIOL 064 | Marine Biology | Fulfills requirement for GE science with lab (life science) |
| BIOL 065 | Wildlife Biology | Fulfills requirement for GE science (life sci) |
| BIOL 071 | Human Anatomy | Prerequisite course for BIOL 072; required prep course for most allied health majors; fulfills requirement for GE science with lab (life science) |

| | | |
|-----------|------------------------------------|---|
| BIOL 072 | Human Physiology | Required prep course for most allied health majors; fulfills requirement for GE science with lab (life science) |
| BIOL 074 | General Microbiology | Required prep course for most allied health majors; fulfills requirement for GE science with lab (life science) |
| BIOL 080 | Biology Field Program | AA/AS applicable; transfers to CSU |
| BIOL 080A | Field Biology – Zion National Park | AA/AS applicable; transfers to CSU and UC |
| ENVIR 010 | Environmental Science | Fulfills requirement for GE science with lab (life science or physical science) |
| OCEAN 010 | Descriptive Oceanography | Fulfills requirement for GE science (life science or physical science) |

Compiled by Janice Toyoshima 10/05/2017

The next table (Table B.2b) summarizes the frequency and time of course offerings by semester (fall, spring, summer) and time of day (day, evening, weekend).

Table B.2b. Frequency and time of course offerings

| Course Number | Course Title | Frequency of Offering | Time of Offering |
|---------------|-------------------------------------|--|------------------------------|
| BIOL 004A | General Principles and Cell Biology | Fall, spring | Day, evening |
| BIOL 004B | Organismal Biology and Biodiversity | Fall, spring | Day, evening |
| BIOL 020 | Human Biology | Summer, fall, spring | Day, evening |
| BIOL 021 | General Biology | Summer, fall spring | Day, evening, weekend |
| BIOL 025 | Forensic Biology | Fall, spring | Day |
| BIOL 033 | Biotechnology and Society | Intersession | Day |
| BIOL 061 | Human Heredity | Summer, fall, intersession, spring | Day, evening |
| BIOL 062 | Plants and Human Welfare | Fall, spring | Online |
| BIOL 063 | Ecology | Summer | Day |
| BIOL 064 | Marine Biology | Fall | Day, evening |
| BIOL 065 | Wildlife Biology | Fall, spring | Day |
| BIOL 071 | Human Anatomy | Summer (alternate years with BIOL 072), fall, spring | Day (evening in summer 2017) |
| BIOL 072 | Human Physiology | Summer (alternate years with BIOL 071), fall, spring | Day, evening |
| BIOL 074 | General Microbiology | Summer, fall, spring | Day, evening |
| BIOL 080 | Biology Field Program | Summer, intersession, spring, fall | Day |

| | | | |
|-----------|------------------------------------|----------------------|--------------|
| BIOL 080A | Field Biology – Zion National Park | Spring | Day |
| ENVIR 010 | Environmental Science | Summer, fall, spring | Day, evening |
| OCEAN 010 | Descriptive Oceanography | Fall, spring | Online |

Compiled by Janice Toyoshima 10/05/2017

Only one course (BIOL 061, Human Heredity) is regularly offered during intersession. When BIOL 080 (Field Biology Program) has Death Valley as its focus and field destination, the on-campus meetings are scheduled during the fall semester course, but the field portion takes place during intersession. Due to its listing as an intersession course, it often does not reach the required enrollment number and is consequently cancelled. Changing the listing to make it a fall semester course, as was the practice in the past, would do much to solve the frustration of low enrollment/cancellation for the course.

A similar situation arises when BIOL 080 has Lassen Volcanic National Park as its focus and destination. The on-campus meetings are scheduled during the spring semester but the field portion takes place in the time between the end of the spring semester and the start of summer session. Putting course in the summer schedule does not allow enough time for students to enroll, and as a result the course is often cancelled due to low enrollment. Listing the course in the spring schedule, as was the practice in the past, would do much to break the cycle of low enrollment and cancellation.

The prohibition against students repeating BIOL 080 is an issue that is being addressed by creating a BIOL 080 series of courses. Each course will focus on a different field destination and a letter designation will identify the different courses. The individual courses may not be repeated due to mandated repeatability restrictions but students will be able to enroll in multiple courses. The creation of the new courses is currently underway.

3. Identify and describe innovative strategies or pedagogy your department/program developed/offered to maximize student learning and success. How did they impact student learning and success?

Dr. Toyoshima has tried to make connections between human anatomy and everyday life by creating extra credit assignments that combine cultural events with observations about human anatomy. A short list of assignments is below, along with brief descriptions for each.

- A. Human anatomy at the opera (Opera San Jose)
- B. Human anatomy applied to on-campus cultural events such as Hispanic Heritage Month, Cinco de Mayo, Asian History Month, Black History Month
- C. Bone compression test in conjunction with ENGR 066 (Properties of Materials)—an ongoing project in its seventh year

Human anatomy at the opera—in this assignment, a student must attend a performance put on by Opera San Jose. The student is given a choice of scenarios to address, depending on the particular opera performed. For example, in the first semester this assignment was used, the opera was *Tosca*, by G. Puccini, in which there is a suicide, an execution, and a murder. The students were asked to explain how jumping off a tower (the suicide), being shot by a firing squad (the execution), and being stabbed (the murder) can result in death. In each case the students had to identify the anatomical structures involved and write a short report. They also had to provide proof of attendance, usually by attaching their ticket stub.

Human anatomy applied to on-campus cultural events—in this assignment, a student must attend a scheduled event and, depending on the event, also write a short report relating the event to human anatomy. Proof of attendance was required, either by checking in with the instructor (also present) or taking a picture clearly showing the student at the event. An example of this assignment was the demonstration of Aztec Dancing to celebrate Latin American Heritage Month. The students were asked to choose the dancing or the drumming accompaniment to observe and identify the movements and muscles involved in making the movements.

The bone compression test came about because of a conversation between Dr. Toyoshima and Dr. Abdie Tabrizi when San Jose State University added a bioengineering specialization in its engineering program. Students who opted for this tract had to take human anatomy. Students enrolled ENGR 066 (Properties of Materials) study and test different materials, applying what they learn about the materials to engineering problems. EVC is the only school in which engineering students are able to study one aspect of human tissue—the compression strength of bone tissue. A long bone such as the femur is dissected from the human cadaver used in BIOL 071 (Human Anatomy) and taken to the engineering lab. The students then learn how to prepare the bone for the apparatus used to test compression strength. After the test is completed, the students write a lab report, which includes an analysis of the data collected. This particular activity has been an excellent recruiting tool for the engineering program. The enrollment in ENGR 066 has grown from under 15 students in each class to more than 25 since the first year of the project.

In order to continue participation in the bone compression project, a schedule for cadaver use has to be followed, so that in the fall semester the cadavers are ready to be returned to the Willed Body Program or will be returned the following semester. This requires close interaction and mutual agreement among the BIOL 071 instructors. Dr. Toyoshima will be retiring at the end of the 2017-18 academic year. It is imperative that a full-time instructor be hired to replace her. Dr. Lee is the other full-time instructor with responsibility for human anatomy, but if the college wishes to continue offering four sections of BIOL 071 per semester and in the summer, it will be easier to regulate use of the cadavers with two full-time faculty than with one full-time faculty and an ever-changing set of adjunct faculty to oversee and mentor. The cadavers represent a significant investment of resources (about \$3,000 each) for the college. There are also no guarantees that cadavers will be available when requested, making it even more important that the instructors work together in planning cadaver use.

Physiology and Microbiology lecturers use the phone app called Kahoot! to check student comprehension during occasional lectures. Teachers log into Kahoot.com to set up quizzes for student to take during lecture. Students then get a passcode to enter on the app during lecture. This gives instructors feedback on student understanding and brings up the chance to immediately discuss material not well understood. Playing games is a fun way to learn for all ages. Students can see their scores after each question. To make it more competitive, the quiz gives them extra points if they are quick to mark their answer. Faculty always get positive feedback when the class plays Kahoot!

Professor Chen incorporated a new intelligent/machine learning software program, Cerego, into her physiology course in spring 2017. Cerego is a personalized learning platform which allows instructors to incorporate open-resource or personal course content into the software program. Cerego uses this information to generate practice questions and review summaries for students. Students reviewed topics created by Professor Chen and received frequent reminders to review course material they had not mastered yet. Additionally, Professor Chen was able to 1) quantify how students were performing and 2) identify topics that needed additional review or modification. Cerego

was available to students on laptops and desktop format during spring 2017, but based on student survey results, most students preferred the use of a smart phone application, which is still in need of further work and improvement. Professor Chen hopes to use Cerego or a similar application again in the future once the software has been fully updated for smart phone use.

Students in marine biology have required field trips to the intertidal zone and to Monterey Bay Aquarium. These field trips provide students with direct exposure to habitats and organisms studied in the classroom, and students are required to complete study packets on these outings that require them to apply concepts and taxonomic information studied in class and lab. This field exposure and application promotes deeper understanding of course material.

For the past three years, students in spring sections of Biol-004B: Organismal Biology and Biodiversity have been participating in an integrated pest management study being conducted by the Environmental Services Department of the city of San Jose. The students perform censuses of owl nesting boxes placed in three Evergreen Valley Parks (Evergreen Park, Grosbeck Hill Park, and Montgomery Hill Park) noting habitation, egg-laying, and fledgling rates. Written and recorded (video and still image) records are kept and turned over to the city. The data is used to calculate pest control rates and estimate the amount of rodenticide-use avoided. Students in the fall sections will be performing owl-pellet analyses to document the identity and relative frequency of prey items in the owls' diets. This activity introduces students to "field work" and engages them in an actual and on-going scientific study. It also get future biologist outdoors!

Students in Biol-004B: Organismal Biology and Biodiversity participate in one required field trip (usually to Monterey Bay Aquarium) where they complete an exercise that requires them to identify examples of organisms that represent the taxonomic groups studied in lecture and lab. This exercise tests students' knowledge and their ability to apply information learned in class. Moreover, it affords students the opportunity to observe organisms studied in lab in a more natural and living state.

4. Discuss plans for future curricular development and/or program (degrees & certificates included) modification.

- A. Update courses identified in section B.1—BIOL 020, 025, 065, 080 and OCEAN 010
- B. Input Internet supplement form for OCEAN 010
- C. Update programs for AA Biology and AA General Studies (with emphasis Health Science)—in progress
- D. Apply for C-ID course ENV5 100—requires revising of ENVIR 010
- E. Develop degree program in environmental science (TMC approved March 2017)—one new lab course in physical geography would need to be developed
- F. Begin working on guided pathways for degree programs—identify GE courses (narrow down the choices for students)
- G. Develop a field biology certificate of specialization—after completing development of BIOL 080 series

5. Describe how your program is articulated with High School Districts, and/or other four year institutions. (Include articulation agreements, CID, ADTs...)

The courses offered by the Biology Department are not currently articulated with high school districts within the SJECCD service area, other than by its policy regarding awarding college credit based on Advanced Placement (AP) test scores (pages 8-9 in the current college catalog).

An item for future discussion is how AP test scores might apply to courses offered by the department.

The majority of courses offered by the Biology Department are transferable to both CSU and UC, as shown in the table (Table B.5a) below. Four courses do not have CSU or IGETC transfer status—BIOL 025, BIOL 033, BIOL 080, and BIOL 080A (refer to ASSIST.org)

Table B.5a. Biology courses transferable to CSU and UC campuses

| Course Number | CSU GE Areas | IGETC Areas |
|---------------|--------------------------------------|---|
| BIOL 004A | B2 (life science), B3 (lab activity) | 5B (biological science), 5C (science lab) |
| BIOL 004B | B2, B3 | 5B, 5C |
| BIOL 020 | B2, B3 | 5B, 5C |
| BIOL 021 | B2, B3 | 5B, 5C |
| BIOL 061 | B2 | 5B |
| BIOL 062 | B2 | 5B |
| BIOL 063 | B2 | 5B |
| BIOL 064 | B2, B3 | 5B, 5C |
| BIOL 065 | B2 | 5B |
| BIOL 071 | B2, B3 | 5B, 5C |
| BIOL 072 | B2, B3 | 5B, 5C |
| BIOL 074 | B2, B3 | 5B, 5C |
| ENVIR 010 | B1 (physical science), B2, B3 | 5A (physical science), 5B, 5C |
| OCEAN 010 | B1 | 5A |

Compiled by Janice Toyoshima 10/03/2017; updated 10/05/2017

The Biology Department currently has four courses with C-ID approval. These courses are found in the table (Table B.5b) below. The courses were revised to match the C-ID course descriptors when they were last updated.

Table B.5b. Biology Department active courses with C-ID numbers

| C-ID Course | Descriptor Title | EVC Course | Course Title |
|-------------|----------------------------|-------------|-------------------------------------|
| BIOL 110B | Human Anatomy with Lab | BIOL - 071 | Human Anatomy |
| BIOL 120B | Human Physiology with Lab | BIOL – 072 | Human Physiology |
| BIOL 140 | Organismal Biology | BIOL – 004B | Organismal Biology and Biodiversity |
| BIOL 190 | Cell and Molecular Biology | BIOL – 004A | General Principles and Cell Biology |

Compiled by Janice Toyoshima 10/03/2017

| | |
|--|--|
| | |
|--|--|

PART C: Student Learning Outcomes and Assessment

1. On the program level, defined as a course of study leading to degree or certificate, list the Program Learning Outcomes (PLOs), and how they relate to the GE/ILOs (<http://www.evc.edu/discover-evc/student-learning-outcomes-%28slos%29>). Please also indicate how the course SLOs have been mapped to the PLOs. *If you are completing this program review as a department or discipline and do not offer any degrees or certificates, please write N/A in this space.*

Table C.1a. AS-T in Biology

| Program Learning Outcomes | Linked to ILO |
|---|---------------|
| 1. Formulate and test hypotheses employing the scientific method, design or implement controlled experiments or observational studies, and collect, interpret and present biological data. | 2 |
| 2. Properly employ scientific terms and concepts, and critically assess biological arguments. | 2 |
| 3. Describe the Theory of Evolution by Natural Selection and explain why it is a central tenet of modern biology. | 1, 2 |
| 4. Compare and contrast living functions and organization of prokaryotes, protists, fungi, plants, and animals at the level of the cell, tissue, organ, organ system, and organism, and characterize the major organ systems of plants and animals and their functions. | 2, |
| 5. Explain the significance of fundamental biological processes and phenomena including biological chemistry and enzymes, cell morphology, DNA replication, cell division, gene expression and regulation, photosynthesis, aerobic respiration, metabolic pathways and coupled reactions, and homeostasis, and as appropriate describe where and when the processes or phenomena occur. | 1,2 |
| 6. Apply ecological principles to explain the natural histories of organisms and their interconnectedness with the environment. | 1,2 |

Table C.1b. AA in Biology

| Program Learning Outcomes | Linked to ILO |
|--|---------------|
| 1. Employ the scientific method to pose testable hypotheses and make predictions. | 2 |
| 2. Design and implement controlled experiments or observational studies to test predictions. | 2 |
| 3. Collect, quantify, summarize, interpret, and present biological data. | 3 |
| 4. Critically assess biological arguments. | 2 |

| | |
|--|-----|
| 5. Use computers to access multimedia lessons and conduct Internet searches for information on biological phenomena. | 3 |
| 6. Write scientific papers and laboratory reports. | 1,2 |
| 7. Use scientific terms appropriately. | 1 |
| 8. Describe the importance of evolution as a guiding principle in biology. | 1,2 |
| 9. Explain and apply general biological principles to include biochemistry, cell and molecular biology, organismal biology, genetics, evolutionary biology, and ecology. | 1,2 |
| 10. Integrate the concepts and systems of homeostasis. | 2 |
| 11. Compare and contrast the cells, tissues, organs, and organ systems of plant and animal organisms. | 2 |
| 12. Apply general chemistry principles to biological processes and systems. | 2 |

Table C.1c AA in General Studies with Emphasis in Health Science

| Program Learning Outcomes | Linked to ILO |
|---|--|
| 1. Use library databases and the Internet to efficiently find information relevant to health science | 3 - Information competency |
| 2. Use appropriate terminology to express physical measurements, describe biological processes. Identify body structures, and name chemical entities. | 1 - Communication |
| 3. Apply scientific principles to solve practical problems in microbiology, physiology, and chemistry. | 2 – Inquiry and reasoning |
| 4. Analyze and interpret experimental or clinical data. | 2 – Inquiry and reasoning |
| 5. Demonstrate use of the light microscope to view cells and tissues. | 3- Information competency |
| 6. Describe homeostatic controls and specific functions of the human body. | 1 - Communication |
| 7. Describe relationships between microbes and hosts, as well as between different taxonomic groups of microbes. | 1 - Communication |
| 8. Assess physical, chemical, and antibiotic measures to control or prevent microbial growth. | 2 – Inquiry and reasoning |
| 9. Identify and describe common microbes, diseases caused, their modes of transmission, and means to reduce their transmission. | 1 - Communication 2 - Inquiry and reasoning 3 – Information competency |
| 10. Describe components of innate and adaptive immune systems and how protection against infections is provided. | 1 - Communication |
| 11. Describe the biology of DNA and microbial genetics. | 1 - Communication |
| 12. Explain how gases, liquids, solids, and solutions behave. | 1 - Communication |
| 13. Predict chemical reactivity, bond types, and molecular polarity from the periodic table and elements. | 2 - Inquiry and reasoning 3 – Information competency |

Table C.1d. AA in General Studies with Emphasis in Natural Science

| Program Learning Outcomes | Linked to ILO |
|--|---------------|
| 1. Apply scientific method to solve practical problems in the sciences. | 2 |
| 2. Collect, analyze, and interpret scientific data. | 2,3 |
| 3. Properly and safely use common scientific laboratory and field equipment. | 1,2 |
| 4. Relate fundamental concepts and properties of matter and energy to biological and physical processes. | 2 |

2. Since your last program review, summarize SLO assessment activities and results at the course and program level. Please include dialogue regarding SLO assessment results with division/department/college colleagues and/or GE areas. Provide evidence of the dialogue (i.e. department meeting minutes or division meeting minutes...).

SLO assessment activities for department courses include exam questions, homework assignments, writing assignments and class projects. Lab courses have additional assessments that require lab skills, equipment use, lab reports and experimental analyses. Biology faculty teaching different sections discuss the assessments and make changes together. As a department, we will be begin adding SLO discussions to monthly department meetings. This will be a chance to highlight some challenges and successes.

Table C.2a. Course Student Learning Outcome (SLO) assessment results and plans for improvement

| Course [Listing only assessed courses?] | Lead faculty | Assessment results | Plans for SLO improvement |
|---|-----------------|---|--|
| BIOL 004A | Baker | All SLOs assessed | |
| BIOL 004B | Baker | All SLOs assessed | |
| BIOL 020 | Baker | All SLOs assessed | |
| BIOL 021 | Tavana | <p>All 7 SLOs have been assessed by multiple sections of Biol 021. Most were satisfactory with the following exceptions:</p> <p>SLO 4: "Describe the unique characteristics of the three domains of life." I constructed three questions two of which when assessed, were satisfactory. One question on prokaryotes however, was not satisfactory. We will reassess in spring 2018.</p> <p>SLO 1:"Apply the scientific method to examine biological phenomena." This was also assessed by all sections last year, and the cumulative result was not satisfactory. This SLO will be assessed again during spring 2018.</p> <p>SLO 3:"Apply genetic principles to analyze patterns of inheritance." This SLO has also been assessed by all sections with no satisfactory outcome.</p> | <p>For SLO 4: We have since purchased a Prokaryote model to help with the visualization, the absence of a nucleus and the presence of one chromosome in the cytoplasm. Emphasis on labeling parts of a prokaryote cell in lab manual. Repeat fall 2018.</p> <p>For SLO 1: Distribute handouts for students to write all the steps of the scientific method pertaining to an experiment performed in the lab. Repeat spring 2019.</p> <p>For SLO 3: This SLO was previously assessed in spring 2017 with unsatisfactory results. We repeated the assessment in fall 2017 and 79% of the students answered the assessment question correctly. Repeat Fall 2019.</p> <p>SLOs 2 and 5-7 will be assessed during fall 2018.</p> |

| | | | |
|----------|-----------|--|--|
| | | We are assessing this SLO again this semester. | |
| BIOL 025 | Lee | All SLO's were assessed on 35 students. The scores ranged from 75-95% correct on each question. | Provide simulated practice exam the day before the official exam; and continue with one-on-one tutoring and open-note examination. |
| BIOL 033 | Toyoshima | Noted that class should be deactivated | |
| BIOL 061 | Gonzalez | SLO's #3 & #6 were assessed on 36 students. For SLO #3, the assessment results for each question were (total of 3 questions): 1) 42%, 2) 86% & 3) 81%. For SLO #6, The assessment results for each question (total of 3 questions) were: 1) 86% correct, 2) 50% correct & 3) 64% correct | SLO#3 - Based on the low success of question 1, the ways in which a mutation must be recognized needs reinforcement or presentation in a different way. Homework problems or an in-class activity address this concept would be useful in reinforcing the information. SLO#6 - Using hands-on activities to simulate the process of recombining DNA from different sources may improve student comprehension and retention of knowledge. Need also to consider the language used in framing the exam question. |
| BIOL 062 | Hays | All SLOs were assessed with most SLOs achieved. The exception was #2: plant growth and reproduction. Next assessment will be Fall 2018. | Add videos to lecture to aid students in visualizing this process. Handout during lecture with fill-in-blank for students to write steps of meiosis and mitosis and names of plant structures. |
| BIOL 063 | Gonzalez | SLO's and ILO's are under development and will be completed by Spring 2018. | |
| BIOL 064 | Baker | 5 of 11 SLOs assessed | |
| BIOL 065 | Gonzalez | SLO's and ILO's have been linked and are in the process of approval by SLO coordinator, Brad Carothers. | |
| BIOL 071 | Toyoshima | Goal is to submit work by March 1 deadline | |
| BIOL 072 | Hays | All SLOs were assessed. The most difficult was #4: Analyze and explain medical and health science-related scenarios of physiological system disruptions. Next assessment will be Fall 2018. | This is a sophomore level course and students are learning basic physiological processes. To help, there will be more examples of health scenarios during lecture and lab. Once students master the material they are able to answer the case study questions better as seen in the assessment. |

| | | | |
|-----------|----------|--|--|
| BIOL 074 | Chen | Three of five SLOs have completed the assessment cycle. All of these SLOs achieved a success rate (grade) of 70% or higher. The most difficult topics for students were the <i>lac</i> and <i>trp</i> operons and the activation of the immune system. The remaining two SLOs are currently being assessed. All five SLOs will be assessed again in fall 2018. | Additional in-class handouts and homework assignments on the <i>lac</i> and <i>trp</i> operons have been successful in increasing student quiz and exam scores on these topics. I will be incorporating additional lecture and homework handouts on the immune system beginning fall 2017. |
| BIOL 080 | Baker | Goal is to submit work by March 1 deadline | |
| BIOL 080A | Baker | Goal is to submit work by March 1 deadline | |
| ENVIR 010 | Gonzalez | SLO's were recently updated and are in the process of approval by SLO Coordinator, Brad Carothers, and will be assessed in Fall 2017. | |
| OCEAN 010 | Hays | All 3 SLOs were assessed and the results were satisfactory. Next assessment will be Fall 2018. | There are no improvements to be made for these SLOs. |

Table C.2b. Program Learning Outcome (PLO) Assessment Results and Plans for Improvement

| Program | Lead Faculty | Assessment Results | Plans for PLO improvement |
|------------|--------------|---|--|
| AA Biology | Tavana/Chen | Assessment data collected in 2016 on student ability to explain and apply general biological principles to include biochemistry, cell and molecular biology, organismal biology, genetics, evolutionary | Interventions will continue. Practice problems in data analysis will be included as an in- |

| | | | |
|----------------------------------|--------------|--|--|
| | | <p>biology, and ecology ranged from 30%-100%.</p> <p>Assessment data collected in 2013 on student ability to employ the scientific method to pose testable hypotheses and make predictions showed that students performance improved drastically (from 58.9% to 79.6%) after group and individual tutoring during lab and office hours in addition to reviewing past exams and quizzes prior to exams, and administering surprise quizzes in class.</p> <p>Assessment data collected in 2013 on student ability to apply general chemistry principles to biological processes and systems ranged from 39%-91%.</p> <p>Assessment data collected in 2012 regarding student ability to collect, quantify, summarize, interpret, and present biological data showed that students improve after practice in writing lab reports (from an average grade of 55% to 69% between the first and second lab report). Student data collected in 2014 showed students do not need further improvement on their use of computers to access multimedia lessons and conduct Internet searches for information on biological phenomena (average grades ranged from 80%-100%).</p> | <p>class or homework activity.</p> <p>Additional descriptions during lecture plus diagrams to illustrate will be included in the lecture presentation. Assessments will continue in spring 2019 and spring 2022.</p> <p>In addition to presentation and handout summarizing required components of a formal lab report, a follow-up activity was added to have students practice writing specific sections of a lab report (abstract, introduction, etc.). Peer review of the practice writings is also planned. Assessment will continue in spring and fall 2018.</p> |
| AS-T Biology | Tavana/Chen | (no matrix available yet on EVC website) AS-T Biology PLO matrix is currently in development. Assessment data will be updated by fall 2018. | PLO improvement data will be updated by fall 2018. |
| General Studies, Natural Science | Lee/Gonzalez | Current matrix has wrong PLOs and will be re-written in spring 2018. Assessment data will be updated by fall 2018. | PLO improvement data will be updated by fall 2018. |
| General Studies, Health Science | Hays | Assessment data collected in 2013 on use of library databases to find health science information showed 5 of the 6 criteria were satisfactorily completed in anatomy courses. Students unsuccessfully used APA format. | Additional emphasis on what constitutes appropriate APA format is required. |

| | | | |
|--|--|---|---|
| | | <p>Assessment data collected in 2012 showed students in microbiology, anatomy and physiology are successfully able to use appropriate terminology to express physical measurements, describe biological processes and identify/name structures.</p> <p>Lab reports from microbiology and physiology students show over 80% of students are able to analyze and interpret experimental data.</p> <p>In 2013, 100% of microbiology and physiology students mastered the use of the light microscope to view cells and tissues.</p> <p>In 2015, anatomy students scored an average of 72% on exam questions related to homeostatic controls and specific functions of the human body.</p> <p>Assessment data collected in 2015 from microbiology students showed the majority of students understand the components of innate and adaptive immune systems and how protection against infections is provided.</p> | <p>No changes will be made to this and the following PLOs. Next assessment date is spring 2019.</p> |
|--|--|---|---|

3. What plans for improvement have been implemented to your courses or program as a result of SLO assessment? Please share one or two success stories about the impacts of SLO assessment on student learning.

Microbiology students had difficulty understanding the details of microbial genetics, especially DNA replication and the *lac* and *trp* operons. Initial SLO assessment of these topics by embedded exam questions showed an average grade of 70% on these topics. After that initial SLO assessment, Professor Chen created a set of handouts and homework assignments outlining the detailed steps of DNA replication and control of operons. Current student performance on these topics now averages 80%.

Azita Tavana: The Biol 021 faculty assessed SLO 3 (Apply genetic principles to analyze patterns of inheritance) in spring 2017. At 68%, we determined the outcome to be unsatisfactory. Obviously, students were having difficulty grasping the concept. I asked the faculty who teach Biol 021 to encourage students to use the tutoring service and to attend office hours in order to receive help with pedigree analysis. In addition, the faculty was advised to provide more practice pedigree analysis to students. We reassessed SLO3 in fall 2017. With 79% correct answers our collective efforts yielded a satisfactory outcome.

PART D: Faculty and Staff

1. List current faculty and staff members in the program, areas of expertise, and describe how their positions contribute to the success of the program.

| | | |
|------------------|--|---|
| Lisa Hays | Physiology, Oceanography, and Plants and Human Welfare | Teaches physiology to prepare students for nursing and allied health careers. Also teaches oceanography, and plants and human welfare, the only online courses offered in department |
| Jack Baker | Biology, Biochemistry, Zoology, and Ecology | Teaches majors general-biology, human biology, environmental science, marine biology, ecology, human genetics, and field courses for non-majors. |
| Janice Toyoshima | Human anatomy, Cell & Molecular Biology, and Biotechnology Education | Teaches human anatomy, a prerequisite course for many allied health majors and part of the General Studies: Health Science degree, and an introductory course in biotechnology. Reviewer for NSF grants. |
| May Chen | Microbiology and Physiology, Biotechnology, and Gene Therapy | Teaches microbiology and physiology to students interested in the health professions. |
| Al Gonzalez | General Biology, and Environmental Science Education | Prepares students for matriculation into higher education and completion of general education science requirements. Also, serves as the ENLACE bio/science coordinator, assists with Chicano/Latino student recruitment into Biology Program and as faculty advisor for the EVC SACNAS student chapter. |
| Azita Tavana | Microbiology, and General Biology | Teaches general biology for non-majors and microbiology for students interested in nursing and allied health occupations. |
| Lee, Terence | Organismal Biology, Human Anatomy and Physiology, and Marine Biology | Teaches human anatomy, general biology, field ecology, wildlife biology, and human biology |

| | | |
|---------------------|-----------------------------------|---|
| Joaquin Li | Microbiology, Inorganic Chemistry | Prepares and organizes classroom materials essential for teaching students, such as media, microbiological culture reagents and science related materials. |
| Robert Blumenkrantz | | Buys and prepares materials to support biology labs. Maintains inventory of lab supplies and equipment, manages lab budget, assists with planning, coordinates equipment maintenance, and supervises student employees. |

2. List major professional development activities completed by faculty and staff over the last six years. In particular with regards to students success, equity, distance education, SLO assessment, guided pathways and/or innovative teaching/learning strategies. Please also discuss department orientation/mentoring of new and adjunct faculty.

Lisa Hays – Developed the first online biology class at EVC: Plants and Human Welfare (2016)

Wrote Biology Adjunct Handbook that includes pertinent information for newly hired faculty

(2015), updates the handbook each year

Teaches two sections of hybrid physiology each year

Teaches online Oceanography

Teaches Field Biology courses

Prepared a comprehensive brochure for the Biology department

Participated in following web conferences:

- * Video editing with Camtasia
- * Synchronous office hours with Zoom
- * Open source textbooks
- * SLO assessment using Canvas
- * How to provide closed captioning with 3CMediaSolutions

Participated in writing the Biology Safety Guidelines (2016), distributes to all Biology faculty each semester

Jack Baker-

Teach major biology series (-004A and -004B)

Teach non-majors courses (ecology, human biology, human heredity, marine biology, field courses)

District Academic Senate

EVC Academic Senate (vice-president)

EVC College Council

EVC Budget Committee

EVC Emergency Response Team (trained)

MSE Division Curriculum Committee (chair)

Member, National Science Teachers Association

Member, National Association of Scholars

Janice Toyoshima-

Chair, All-College Curriculum Committee, 2013 to present

Member, All-College Curriculum Committee, 2004-2013

Member, MSE Division Curriculum Committee, 2002-present

Member, SLOAC, 2012 to present

Member, Accreditation Steering Committee, 2010 to present

Participant, Shared Governance Chairs, 2016 to present

Professional Development

Curriculum Institute, 2013-2017

Regional curriculum meetings (North), 2013 to present

Human Anatomy & Physiology Society annual meetings, 2011 (Victoria, BC), 2012 (Tulsa, OK), 2013 (Las

Vegas, NV), 2016 (Atlanta, GA)

American Association for the Advancement of Science annual conference, 2016 (San Jose, CA)

Anatomia Italiana, 2014 & 2016

Course and program revisions—BIOL 061, BIOL 071, AA General Studies with emphasis in Natural Science, AA General Studies with emphasis in Health Science (in progress)

May Chen – Secondary Health and Safety for EVC Emergency Response Team (2016-2017)

Hazardous Waste Generator Training for Microbiology Laboratory (2016)

EVC Pre-Meds Club Advisor (2013-2014),

Vaccines Health and Safety Course – University of Pennsylvania Medical School (2013)

SLO assessment (2011-current)

Mentoring of new and adjunct faculty (2011-current)

Al Gonzalez- Attended the following conferences:

* Society for the Advancement of Chicanos and Native Americans in Science in Long Beach, CA (2016)

* On-line Teaching in Long Beach, CA (2011)

Both conferences provided insight on teaching strategies, using computer technologies to aid with student instruction, retention and assessment, update on scientific research projects, student summer research opportunities, and in-classroom & online ADA compliance.

Azita Tavana – Wrote a Laboratory Guideline for EVC Biol 021 Faculty (winter 2016) in order to standardize the topics covered, the assessment methods and our expectations from students for the 11-12 sections that the department offers during fall and spring and 4 sections during summer of each year.

Write and coordinate the lab schedules for all sections of Biol 021 each semester.

Collect data from all Biol 021 sections for SLOs assessments (2011-present)

Updated course outline and SLOs for Biol 021 (2015)

Served on hiring committees for the Associate Dean of Student Services and for the Biology Faculty (spring and summer 2015)

Served on IEC (2014, 2015), participated in the program review for the Student Health Services

Updates specimens identifications in EVC Natural Science Museum
Canvas training (summer 2016)

Presentations for faculty teaching Biol 021 during PDD (spring and fall 2017)

Conducted review processes for multiple adjunct faculty

Mentoring adjunct faculty

Attended following seminars at UC Berkeley and/or Stanford University:

- * "Revisiting the scale-dependence of the biotic-abiotic paradigm in evolutionary biology," presented by Lucy Tran (March 30, 2016)
- * "Waging peace: Diplomatic relations in animal-bacterial symbioses," presented by Margaret McFall-Ngai (March 31, 2016)
- * "Social mobility and support for democracy: Re-evaluating de Tocqueville," presented by Konstantin Sonin (Apr 4, 2016)
- * "Cues at the interface: Model engineered extracellular matrices to deconstruct cancer metastasis," presented by Kristopher A. Kilian, Department of Bioengineering; Micro and Nano Technology Lab; Institute of Genomic Biology, University of Illinois at Urbana Champaign (Apr 20, 2016)
- * "Convergent evolution in the history of ideas: Darwin, Wallace and the discovery of evolution by natural selection," presented by Dr. Andrew Berry, Harvard, Department of Environmental Science, Policy and Management (Apr 21, 2016)
- * "Gene editing, Bioethics," presented by Dr. Silvia Camporesi, Department of Social Science, Health and Medicine, Kings College, London, U.K. (Apr, 2016 at Stanford University)
- * "Of food and fungi: Tales of fungal diversity and fire," presented by Sydney Glassman (Apr 28, 2016)
- * "Human and non-human industrial contamination as settler colonialism in an American Indian community," presented by Elizabeth Hoover, Ph.D. Brown University, American Studies and Ethnic Studies Department (May 02, 2016)
- * "How the threat of infectious disease influences consumption," presented by Josh Ackerman, University of Michigan (May 4, 2016)
- * "Gut bacteria co-speculated with hominids," presented by Andrew Moeller (May 16, 2016)
- * Climate change evidence and causes: An overview from the Royal Society and the US. National Academy of Science," an five-hour event offered by the UC Berkeley Museum of Paleontology. (March 07, 2015)
- * Sciences/Biotechnology Marketplace at Chabot College (December 6, 2014)
National Biotech Engineering Conference (NBEC) at Santa Clara University (Feb 15 and 16, 2013)

Attended following webinars:

- * "Don't get lost in translation: How smart design and technology are enabling bench-to-bedside in translational research," presented by Dr. Bruce Levine, PhD, from the Center for Advanced Cell Therapy, University of Pennsylvania Children's Hospital; Dr. Laurence Copper, PhD, MD Anderson Cancer Center (Oct 14, 2015)
- * "Engage your students with MindTap for Biology," offered by Cengage Learning

Company (Oct 14, 2015)

- *“ Precision Medicine,” presented by Dr. Geoffrey Ginsburg and Dr. Elizabeth Worthey (Aug 13, 2015)
- * “Using what students know to promote original work and critical thinking,” by Turnition Communications (April 22, 2014)
- * “Why students plagiarize,” by Turnition Communications (April 30, 2014)
- * “The everyday importance of STEM,” by John Rennie, McGraw Hill Education (October 2, 2014)
- * “Helping schools deal with tragedy.” (Jan 16, 2013)
- * “Teaching action potential,” by Simbio (Jan 24, 2013)

Terence Lee - Received \$3000 from the president to setup a native plant garden
Created a scholarship for the biology field course
Joined the committee for cadaver use (HAPS)
CTC committee – helped to develop a campus technology plan for EVC
Worked closely with the skill lab
Wrote numerous letters student letters of recommendations for nursing and medical school.
Represented EVC at a Cub Scout nature event
Represented the Biology Dept at graduation
Co-sponsored a plant symposium with the California Native Plant Society
Served on the screening committee for the Director of Student Life
Was a pilot instructor for CANVAS
Represented the Biol Department at the MS3 open house
Represented the Biol Department at the Spooktakular
Collected SLO data for Biol 25 and 21
Helped with the PLO’s for the General Studies with Emphasis in Natural Sciences
Performed classroom observations for adjunct instructors
Received CPR training (2016)
Attended the following conferences and/or workshops:

- * HAPS conference (Human Anatomy and Physiology Society) (2017)
- * American Association for the Advancement of Science (2016)
- * OEI (Online Education Initiative workshop (2016)

Robert Blumenkrantz

Joaquin Li- Hazardous Waste generator training for microbiology laboratory 2016

PART E: Budget Planning

1. With your Dean, review the department Fund 10 budget and discuss the adequacy of the budget in meeting the program’s needs.

Evergreen Valley College Detail by Cost Center

Fiscal Year 2017

0400 - Biological Studies

Fu Lo Cctr User Objct ID-Line Description Budget

511 - Instructional Salaries, Regular Sal Sch. \$646,538.20

513 - Instructional Salaries, Nonregular Sch. \$470,624.50

522 - Instructional Aides, Reg. Full-time Sch. \$140,474.76

524 - Instructional Aides, Non-reg. Full-time \$0

531 - STRS \$106,804.00

532 - PERS \$19,950.93

533 - OASDI/Medicare \$29,112.80

534 - Health & Welfare \$263,794.15

535 - State Unemployment Insurance \$2,817.83

536 - Workers Compensation \$18,526.50

17 21 0400 22500 54100 13936 - 26 Lottery - Instructional Supplies (Biology) \$13,000

541 - Instructional Supplies \$19,557.23

551 - Personal Services ?

10 21 0400 00000 55200 13784 - 8 Biological Studies \$1055

10 21 0400 00000 55210 13784 - 7 Nat. Sci. Field \$750

552 - Travel & Conference?

0400 - Biological Studies ?

The current budget is not adequate to support the desired number of full time instructors.

The current budget is not adequate to provide the desired hours for the Biology Skills Lab.

The current budget does not include maintenance of equipment such as autoclave, incubators and refrigerators.

2. Identify an external (fund 17) funding the department/program receives, and describe its primary use.

17 21 0400 22500 54100 13936 - 26 Lottery - Instructional Supplies (Biology) \$13,000

541 - Instructional Supplies \$13,000 (this amount is also included in Part A)

Fund 17 money is used for the Biology Lab supplies budget. It is the base amount of money available to supply all of the Biology classes with everything that they require for their labs. The base amount of Biology supplies budget has not changed in over sixteen years. Due to inflation and the rising prices of scientific laboratory supplies, the buying power of this budget has been greatly reduced. This has led to the necessity of making due with less. This has prevented the necessary replacement of aging and worn equipment, models and slides. And this has also prevented trying new labs and new technologies.

Starting in 2014 Biology was given "extra" money to buy cadavers used in the Human Anatomy labs. (The cost of the two cadavers needed every other year is over \$6000, almost half of the base budget.) This money is helpful and greatly appreciated. However, the money is not guaranteed and the amount, if any, uncertain. This uncertainty makes it difficult to plan for and coordinate purchases necessary for labs

In 1975 when EVC opened, the budget for the Department was \$9,000. Over 40 years later, the guaranteed base is at \$13,000. We cannot offer high quality laboratory courses to our students with such a small budget for

supplies and equipment. In comparison, Mission College in Santa Clara offers a similar number of Biology courses and has a budget of \$27,000. San Jose City College's instructional supply budget for 2017-18 is \$41,800.

PART F: Technology and Equipment

- Review the current department technology and equipment needed and access program adequacy. List any changes to technology of equipment since the last program review.

The Biology Department is comprised of six laboratories and several prep and storage areas. Two of the labs are equipped with gas, air and vacuum outlets; three of the labs are equipped with gas and air outlets; and one lab is equipped with gas outlets. Three of the labs have fume hoods and one lab has a biological hood. One lab is dedicated to the teaching of Anatomy and has an adjacent room equipped for cadaver dissection. One lab is dedicated to the teaching Microbiology. One lab used for the study of Botany and is adjacent to a small greenhouse that has no plumbing for water. The other three labs are fit to be used for a variety of Biology courses. All labs are equipped with a computer and a data projector.

BIOLOGY COURSES WITH LABS:

- General Principles of Biology
- Organismal Biology
- Human Biology
- General Biology
- Marine Biology
- Human Anatomy
- Human Physiology
- General Microbiology
- Environmental Science

EQUIPMENT:

- Microscopes
- Dissecting Microscopes
- Microscope with projection camera
- Combination Hot Plates/Magnetic Stirrers
- Analytical Balances
- pH meters
- Water baths
- Centrifuges
- Spectrophotometers
- Incubators
- Explosion proof refrigerators
- Sliding door refrigerators
- Articulated skeletons
- Unarticulated skeletons
- Cadavers
- Refrigerated cadaver storage unit

- Cadaver dissecting table
- Anatomical Models
- Zoological models
- Botanical models
- Physiology Power Lab Hardware and Software connected to old Mac computers
- Lap top computers
- Audiometers
- Laboratory carts
- Autoclave
- Glassware washer

MATERIALS:

- Glassware (beakers, flasks, pipettes, graduated cylinders of varying size)
- Pipette aids
- Test tubes
- Test Tube racks
- Petri dishes
- Blank microscope slides and cover slips
- Prepare microscope slides
- Microscope bulbs
- Thermometers
- Dissecting trays
- Dissecting tools
- Dissecting materials
- Chemicals
- Solutions
- Reagents
- Buffers
- Blood
- Blood sera
- Blood testing supplies
- Lancets
- Face Masks
- Sleeve protectors
- Gloves
- Lab aprons
- Safety goggles

WASTE:

- Hazardous waste (once a semester pickup) currently paid for by District Office
- Biomedical waste (once a semester pickup) paid for by Biology Department

EQUIPMENT MAINTAINANCE and COST:

- Microscopes serviced once a year
 - \$3050 for six days of service and up to \$200 in parts/bulbs, paid by District
- Autoclave serviced four times a year and as needed

- \$3140 for four regularly scheduled visits, paid by District
- Stericycle Biohazardous waste pick-up
 - \$500 paid by department

ADDITIONAL MAINTAINANCE NEEDED

- Fumigating the museum, needs to be an annual event, currently done as needed
 - \$350. Department paid for the last fumigation. In the past, the District paid for annual fumigation.
- Cadaver refrigerator
 - \$12,000 plus service contract for regular maintenance
 - Adding more sections of human anatomy may require additional lab space with an attached human anatomy theater and cadaver refrigerator

Since the past program review the Biology equipment is very slowly being replaced. The microscopes and models are heavily used by multiple sections of several courses. There has not been enough money to buy new equipment or to properly replace what we already have. This has led to the necessity of using broken and damaged equipment and models. Since much of the equipment is the same age, the Biology Department will be in trouble when the equipment becomes unusable. Equipment and materials should be replaced and updated in stages so that the need to replace a vast amount of equipment and material does not become a reality. There should be a dedicated budget to do this.

There is no dedicated budget for Biology equipment repair. This means that when a piece of equipment, particularly refrigerators, ovens, incubators and the autoclave, has a problem we do not know if there is money to have it repaired. This causes uncertainty and delays and can easily result in the disruption of classes. This is especially true with the autoclave and Microbiology.

There is also no dedicated budget for equipment maintenance. Sometimes the District covers the cost and sometimes it doesn't. When the instructional budget is only \$13,000, the cost of \$500 Biohazard waste removal lowers the quality of the experiments we can offer our students in lab classes. The District needs to cover all of the equipment maintenance so the instructional budget can be used for instruction.

Since the last program review we added a set of classroom laptops and PowerLab software to run physiology experiments that include electrocardiograms (EKG), pulmonary lung volumes, reaction times, biofeedback and electromyograms (EMG). The department received new microscopes in two lab classroom and a new class set of spectrophotometers. The biology skills lab received a yearly subscription to ADAM interaction anatomy/physiology software.

ESSENTIAL OPERATIONAL SUPPLIES

- Aluminum foil saran wrap—4A, 4B
- Autoclave parts – \$2,000/year
- Blood agar plates about \$280 per semester (3 per student x 80 student x \$11.74 / 10 plates per sleeve). Annually is \$700 - microbiology
- Enteropluri media strips for the identification of Enterobacteriaceae (box of 25 strips) \$445 per box, need 20 per semester. Annually 2 boxes is \$890. - microbiology
- Band-aids—physio and anatomy
- Bio pac electrodes and replacement parts--physio
- Blood sera—physio \$100/semester
- Bottled water--physio

| | |
|---------------------------------------|-------------------------|
| Centromeres—Bio 4A, 21 | \$37.50/10 |
| Chara—Bio 21 | \$20/sem |
| Chemicals—all | |
| Coffee filters—20, 21, 4A | |
| Cow eyes—anat and 20 | \$40/sem |
| Crabs—64 | \$70/sem |
| Cultures—bi0 4A, 4B, 21 and 64 | \$350/semester |
| Cut flowers—4B | \$75 |
| Dialysis clamps | \$5.75 each |
| Dialysis tubing | \$57.75/100' 3/semester |
| Disposable aprons—anat | \$235/500 aprons |
| Dissection equipment—anat, 4A, 4B, 64 | |
| Dissection materials: | |
| Dixie cups—bio 20, 21. 4A | |
| DNA fingerprinting—4A | \$240/sem |
| Dogfish—4B and 64 | \$75/sem |
| Eldon cards—blood testing—Anatomy | \$152.00/30 4/semester |
| Elodea—4A, 4B, 20, 21, 64 | \$150/sem |
| Frogs—4B | \$50/sem |
| Fruits and vegetables—4B | \$50 |
| Gladiolas—21 | \$75/sem |
| Glassware—all | |
| Gloves--all | |
| Lab coats | |
| Labelling tape--all | |
| Lambda DNAs—4A | \$190/sem |
| Lancets--physio and anatomy | \$75/200 |
| Lens paper—all | \$1.60/100 |
| Liverwort—Bio 21 | \$144 |
| Microbiology media | |
| Microbiology stains | |
| Micropipette tips—4A | |
| Moss—Bio 21 | \$120 |
| Paraffin—4A, 4B, 64 | |
| Perch—bio 4B and 64 | \$50/sem |
| pH paper—bio 4A, 21, physio | \$50/ |
| Pine nuts—21 | |
| Plants—bio 4A, 4B, 21 | |
| PTC paper—4A, 4B 20, 21 physio | \$3.50/100 |
| Recombinant DNA and transformation—4A | \$260/sem |
| Sandwich bags—20, 21, 4A | |
| Seeds—4B | |
| Sharpies | |

| | |
|-------------------------------------|---------------|
| Sheep brains—anat and 20 | \$200/sem |
| Sheep hearts—anat | \$50/sem |
| Sheep kidneys—anat | \$30/sem |
| Sigma Aldrich sera and chemicals—4A | \$300/sem |
| Simulated urine | \$80/semester |
| Slides and coverslips--all | |
| Strawberries—bio 20, 21, 4A | |
| Synthetic blood testing —bio 20 | \$60/semester |
| Thermometers | |
| Ulva—bio 4B | \$29.50/sem |
| Urine strips—bio 4B, 20 and physio | \$50/semester |
| V 8—physio | |
| Wisconsin fast plants—4A | \$190/ |

NEEDED EQUIPMENT

- 3D printer to create biological models and replace broken parts
- Analytical balances (3)
- Audiometers (9) – need total 12 for one section of physiology lab
- Bunsen burners for student labs (25) – disrepair
- Cactus garden, shed, tools, water
- Cadaver refrigerator
- Lab chairs (192) – for all lab classrooms
- Combination hot plates/magnetic stirrers (3) – do not have enough to meet needs of classes
- Data projector -
- Distilled water cartridges – for all lab courses needing water and solutions
- Dry block incubator – physiology thermoreceptor experiments
- Electrophoresis equipment
- Flower pots – majors biology
- Glass shelves for museum – need additional shelving for display cases and need to secure existing shelves
- Greenhouse renovation for water and air ventilation
- Ice machine – use of ice is greater than ice trays from freezers can supply
- Incubators (2) for microbiology – old and damaged
- Instant film camera – cadaver photos
- Instructional outdoor garden for general biology
 - Liverwort (*Marchantia*)
 - Moss (*Mnium*)
 - Club moss (*Lycopodium*)
 - Spike moss (*Selaginella*)
 - Horsetail (*Equisetum*)
 - Whisk fern (*Psilotum*)
 - Other types of Ferns
 - Cycad (*Zamia*)
 - Cactus
 - *Lilium*
 - *Ephedra*
 - *Gnetum* tree

- Pine tree
- Cup fungi
- Mushrooms
- Puffballs
- Fruticose lichen
- Microscopes for microbiology (29) – phase contrast microscopes needed for this specialized class
- Microscopes for general biology, physiology, human biology classrooms (120)
- Models (botanical, biological, anatomical) – need to replace worn and broken models
- Museum computer and projector
- Museum sun blocking screen – retractable for ceiling
- Native plant garden
- Ophthalmoscopes (4) – need total of 6 for physiology labs
- pH electrodes (8) – need for replacement
- pH meters (6) – need set for classroom
- Physician’s scale – 40 years old and broken
- Prepared microscope slides – classroom sets
- Printers for labs and offices (12)
- Refrigerator for microbiology lab
- Respirometers - replacement
- Shaking water bath for microbiology lab
- Student kits: majors biology
 - DNA transformation
 - Forensic DNA
 - Wisconsin fast plants
- Thermal cycler for PCR - genetics
- Vegetable and flower seeds – majors biology

NEEDED REMODEL TO BUILDING

- New white boards for laboratory rooms
- Light switches near entrance doors – currently the switches are only by the inside door which requires crossing unsafely across a dark classroom to turn lights on and off.
- Plumbing for water to the green house and air ventilation
- Office for Biology Skills Lab instructional assistant with view of students
- Repair kick plates and table legs in all biology labs
- Blind pulls need repair in several biology labs
- Coat racks in all lab classrooms
- Microbiology lab lockers need repair – doors don’t close and doors missing
- Additional space in Sequoia remodel for anatomy theater
- Additional space in Sequoia remodel for biology skills lab
- Additional space in Sequoia remodel for additional biology lab classroom

PART G: Additional Information

Please provide any other pertinent information about the program that these questions did not give you an opportunity to address.

In addition to the need for a larger operational budget to support its current program, the department needs sustainable multi-year funding in order to plan for and cover the costs of the repair and replacement of “big ticket” items. These costs are foreseeable, expected, and can be planned for with appropriate funding. Unfortunately the department must rely on and compete with other departments for an unreliable source of “one-time” money provided by the district or the college. Additionally, the department needs additional funding – funding not tied to existing expenses – for innovation and expansion of course and subject offerings.

PART H: Future Needs and Resource Allocation Request:

Based on the areas noted below, please indicate any unmet needs for the program to maintain or build over the next two years. Please provide rationale on how the request connects back to SLO/PLO assessment, strategic initiatives or student success. If no additional requests are needed in any of the areas, put N/A.

| | | |
|--|---|---|
| <p>Faculty and staffing requests</p> <ol style="list-style-type: none"> 1. Increased hours/months for biology skills assistant– see Appendix A 2. Full-time faculty member (bring department total to 8. 3. Full-time faculty hires to replace retiring faculty members | <p>Ongoing Budget Needs:</p> <ol style="list-style-type: none"> 1. \$25,000/year 2. \$75 - \$85,000/year <p>One-time Expenditure:</p> | <p>Request linked to:</p> <p>SLO/PLO #:</p> <p>Strategic Initiatives (student centered, organizational transformation, community engagement): <u>student centered</u></p> <p>Improving Student success rates:</p> <p>Achievement of program set standard for student success:</p> |
| <p>Facilities</p> <ol style="list-style-type: none"> 1. Additional anatomy theater 2. Biology skills lab 3. Water, relocating the electronic controls and air | <p>Ongoing Budget Needs:</p> <p>One-time Expenditure:</p> <ol style="list-style-type: none"> 1. Sequoia remodel 2. Sequoia remodel | <p>Request linked to:</p> <p>SLO/PLO #:</p> <p>Strategic Initiatives (student centered, organizational transformation, community engagement): <u>student centered</u></p> <p>Improving Student success rates: improving student success</p> |

| | | |
|--|--|--|
| ventilation in greenhouse 4. Instructional garden on side of Acacia | 3. \$1,000 water, \$1,000 air, \$1,000 electrical 4. \$15,000 water, \$1,000 plants | Achievement of program set standard for student success: |
| Technology 1. 3D printer for anatomy lab 2. Thermal cycler PCR | Ongoing Budget Needs: One-time Expenditure: 1. \$1000 2. \$8000 | Request linked to: SLO/PLO #: Strategic Initiatives (student centered, organizational transformation, community engagement): <u>student centered</u> Improving Student success rates: Achievement of program set standard for student success: |
| Equipment/Supplies 1. See list in Part F | Ongoing Budget Needs: One-time Expenditure: 1. \$250,000 | Request linked to: SLO/PLO #: Strategic Initiatives (student centered, organizational transformation, community engagement): <u>student centered</u> Improving Student success rates: Achievement of program set standard for student success: |

Appendix A

This is our second program review to include the need for additional hours for the Biology Skills Lab Instructional Assistant Lab Lead. Many of the students who utilized the Biology Skills Lab are majors that are focused in health science. It is imperative that we offer these students the necessary means to be successful in prerequisite courses such as Anatomy, Physiology, and Microbiology. Acceptance into majors in health science is very competitive, such as acceptance into a nursing program. Our students' success in these prerequisite courses reflects their success in the future.

Currently our Instructional Assistant works 30 hours per week, 9 months per year. The cost of benefits will not increase for the employer. The differences in cost for the employer would be salary, PERS contributions, and additional taxes such as workers compensation. The table below represents an estimate of the differences in cost for the employer with an annual work schedule of 30 hours per week (9 months), 30 hours per week (11 months), 40 hours per week (9 months), and 40 hours per week (11 months).

| Estimated Employer Cost | | | | |
|---------------------------|--|--|---|---|
| | Current Part-Time (30 hours) 9 Months | Projected Full-Time (40 hours) 9 Months | Projected Part-Time (30 hours) 11 Months | Projected Full-Time (40 hours) 11 Months |
| Annual Salary | \$ 36,996.15 | \$ 47,335.81 | \$ 44,625.75 | \$ 57,508.61 |
| Pers Ntaxed Instr. Normal | \$ 5,745.87 | \$ 7,351.72 | \$ 6,930.83 | \$ 8,931.66 |
| Tax Benefits | \$ 2,904.19 | \$ 3,715.86 | \$ 3,503.12 | \$ 4,514.41 |
| Total Annual Cost | \$ 45,646.21 | \$ 58,403.39 | \$ 55,059.70 | \$ 70,954.68 |

Notes from meeting: