# Pre-Health Program Review
# Self-Study

*Spring 2015*

***1.1 Introduction.*** The Pre-Health Program is part of the Biology Department at Solano College and has been in place for 45 years. Our classes cover the basic medical sciences: Anatomy (Bio 004), Physiology (Bio 005) and Microbiology (Bio 014) that are required for entry into health professions such as nursing, dental hygiene, physician assisting, physical therapy, pharmacy and many others. Our classes also fulfill the natural sciences requirement for the Certificate of Achievement and A.S. degree and are fully transferable to CSU and UC systems (AA/AS Area A, IGETC Area 5 Biological, CSU GE Area B2). Over the last 10 years we have successfully responded to greatly increased student demand by appointing new faculty, expanding the number of sections offered and offering new sections at Vallejo and Vacaville Centers.

Currently we are running five sections of microbiology, six sections of physiology and ten sections of anatomy spread across the Fairfield Campus and the Vacaville and Vallejo Centers each semester. This represents up to 630 students served in any one semester. Our current FT faculty are: Gene Thomas, Phil Summers, Patsy Itaya, Margherita Molnar, Jim Dekloe, Rennee Moore, Ed Re, James Word and Cristina Young. Adjunct faculty include: Erwin Bautista, Alysia Thomas, Ann Hefner-Gravink, Robert Cattolica, Lily Nosce, Kathy Clark, Margaret Kenrick, Francisco Goes DaSilva, and Francis Farahnak.

### *1.2 Relationship to College Mission and Strategic Goals.*

The AHP mission closely aligns with that of the college. We help an increasingly ethnically and academically diverse population of students obtain their educational goals. Our mission is to provide quality instruction to students interested in Health Occupations. By connecting theory to clinical practice, we help students develop workforce and transfer level skills including: understanding medical terminology, scientific method, detailed record-keeping, critical thinking and problem-solving. Our faculty are deeply committed to providing the rigorous training required in our health care professionals.

Table 1. SCC's Strategic Directions and Goals

| Goal 1: Foster Excellence in Learning | Program Evidence |
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| Obj. 1.1 Create an environment that is conducive to student learning. | Faculty utilize Smart classroom technology, including internet, videos, and PowerPoint, to demonstrate concepts and techniques. Course lecture notes and relevant websites are shared with students at a course website through e-companion in Canvas platform; this serves as a valuable review resource. These courses provide extensive laboratory training. Anatomy uses extensive cadaver dissection to reinforce teaching of anatomical structures; physiology uses BioPac monitors that allow students to learn physiology by monitoring their own body function; microbiology teaches students the standard microbial techniques used to grow and visualize bacteria. To assist students with the study of microscopic anatomy of cells and tissues, students have been provided with an on-line histology atlas of slides observed in the lab; this atlas has been prepared by our faculty. The emphasis in lab is for students to gain hands-on experience in different teaching formats. To facilitate the achievement of learning outcomes, students are encouraged to form study groups and to use the free tutoring service available at the Solano College Tutoring Center. This center has been supplied with anatomical models and other biology supplies which have been purchased by the Associated Students Solano College (ASSC) grants written by our faculty. Boxes of bones have been donated for study at the following locations: SCC Tutoring Center and Library, public libraries in Fairfield, Vallejo, Vacaville, and Travis Air Force Base Library. Making the bones and models available to students outside of their scheduled labs at the college facilitates their learning experience, especially when students have to miss labs. Additionally, embedded tutors have been used extensively in both anatomy and physiology courses to provide extra help to students enrolled in these courses. Finally, in order to enhance attainment of educational goals by students, our courses have been expanded to Vacaville and Vallejo Centers, enabling students to travel less distance and better coordinate their work schedules. |
| Obj. 1.2 Create an environment that supports quality teaching. | Effective communication at regularly scheduled faculty/division meetings allows for planning, interaction and exchange of ideas among faculty. Furthermore, Flex opportunities are provided which encourage professional development. Faculty in the pre-Health component participate in California Community College Biology Faculty Enhancement through Scientific Teaching (CCB FEST) |

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| | meetings which are resources for Science teaching techniques and provide a network of instructors interested in Science education. The National Science Foundation funded CCB FEST organization represents collaboration between San Francisco State U. and the CA community colleges. The full-time faculty members of pre-Health are committed to providing support and mentoring to new faculty to ensure that we maintain quality instruction in our courses, for example, the recent acquisition of subscriptions to an on-line dissection guide to enhance the development of anatomical dissection skills. A 2014 ASSC grant has funded this purchase. |
| Obj. 1.3 Optimize student performance on Institutional Core Competencies | I. Communication<br>During lectures, demonstrations and lab work, students develop competence in listening and responding to questions, reading comprehension, writing essays and reports and communication with faculty and fellow students.<br>II. Critical Thinking and Information Competency<br>In lab sessions students are required to collect and analyze data, perform calculations, draw conclusions, solve problems and sometimes design their own experiments.<br>III. Global Awareness<br>A. Scientific Complexities.<br>Through lectures discussions and lab work, students develop an understanding of scientific methodology and its application in experiments. In microbiology, students learn that the profile of diseases common in developing countries is different than the diseases important in developed countries like the United States.<br>IV. Personal Responsibility and Professional Development<br>B. Social and Physical Wellness<br>Through discussions and lab work, students develop appropriate social skills in group settings. |
| **Goal 2: Maximize Student Access & Success** | **Program Evidence** |
| Obj. 2.1 Identify and provide appropriate support for underprepared students | Pre-Health classes can be very challenging for students, and for some they may be the first science classes they attend. Many of them find themselves not fully prepared for the demanding work. The Human Anatomy and Human Physiology classes have been fortunate to have a series of "embedded tutors" supplement the instructors' work in the laboratory. In the last year alone we have had a total of 15 of these students, some new and some very experienced, enriching our labs. They are especially useful in providing individual and small group instruction in what are often large group settings. Our Tutoring Center is free and available to any student five full days a |

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| | week. In the last year it has provided 1547 hours of Anatomy/Physiology and Microbiology tutoring. Over the years, we have been able to provide the Center with models, posters, microscopes and slides, partially with the help of the college students' association (ASSC). Through personal instructor initiative we have provided most local libraries with sets of reproductions of human bones for student use. Instructors use early assignments to identify struggling students and refer them to the college SARS early alert system. Counseling then contacts the student and directs them to appropriate campus resources. |
| Obj. 2.2 Update and strengthen career/technical curricula | While teaching hundreds of students their prerequisite courses, we have been able to concomitantly run two honor classes (Bio 99 and Bio 49) that are designed for those that have done very well in Human Anatomy. Their work is performed independently under the supervision of an instructor, and it involves advanced dissecting (with attention to new, advanced acquired knowledge and technique), as well as participation in special projects such as community outreach and clinical correlation sessions. Aside from furthering the honor students' knowledge, these courses provide for continued science mentoring as well as career mentoring. They build self-confidence and strengthen the resolve and opportunity (via favorable recommendation) to continue in a Nursing or Health career, with some even continuing on to Medical School. Microbiology serves as a prerequisite to our biotechnology program; this program is formally designated as a career/technical education program by the California Community College Chancellors Office that can lead to a professional certificate. |
| Obj. 2.3 Identify and provide appropriate support for transfer students | Since we do not award certificates or degrees, we are not a true program but a series of three classes that are the prerequisite for many professions in the health field. Each class can be taken individually if needed or if a student has an interest in it, and each class is transferable to the UC and state universities. We have seen an increasing number of state university and UC students who are coming back to take these classes in a "reverse transfer"; this demographic might increase if we offer more classes in Vacaville which is closer to the universities. |

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| Obj. 2.4 Improve student access to college facilities and services to students | We have greatly improved student access by establishing two new sections of Physiology at Vacaville, two new sections of Microbiology at Vallejo Center and a new section at Vacaville Center. Our entry class is Anatomy and this is the most impacted, due to lack of lab space. This highlights our need for a new anatomy lab at Vacaville Center. Our extensive use of e-companions in canvas to enrich in-class teaching has also greatly improved student access to class documents, active learning experiences, interaction with instructors, other students and multimedia presentations. Since we post announcements and links to campus events and workshops, we have enhanced student awareness of campus services. |
| Obj. 2.5 Develop and implement an effective Enrollment Management Plan | Classes are offered in a way that is geared to student's needs. At Fairfield anatomy, physiology and microbiology are offered at different times during the day and also at night. At Vacaville both physiology and microbiology are offered with a schedule that includes day and night classes. At the Vallejo Center only microbiology is offered. We are considering expanding our offerings of anatomy at the Vacaville Center and of physiology at the Vallejo Center in the future, based on enrollment and funding. |
| **Goal 3: Strengthen Community Connections** | **Program Evidence** |

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| Obj. 3.1 Respond to community needs | The pre-Health component of Biology has been involved in projects providing support to instructors and students in the public school system. First of all, for the past 25 years, anatomical demonstrations have been given to instructors and students of Anatomy & Physiology (A & P) courses at regional high schools. During our recent presentation at SCC (May, 2014), presenters (faculty and dissectors) gave demonstrations on the cadavers and models in our anatomy lab. The purpose of this event is to enrich the anatomical knowledge of guests and to introduce the Biology program. Secondly, at a recent 'College Night' event at Winters High School, a Physiology faculty member demonstrated a model of a brain and a skeleton as well as presented information on various Health Career paths. The Winters High School students were reminded of the opportunity to begin their college program of study at SCC. Thirdly, a workshop on Urinary/Reproductive Systems was held at the Anatomy lab at the Fairfield campus of SCC in April, 2014. Instructors and 25 students from their A & P courses participated in this hands-on workshop, which was funded by the American Association of Anatomists (AAA Educational Outreach Grant). Instructors were provided with pig kidney specimens, microscopic slides and charts of the 3 systems, and power point lectures; these materials will be shared with their A & P classes. This is the second AAA sponsored/funded workshop that has been held at SCC; the workshop on the Cardiovascular System was held in 2009. According to the guest instructors, supplies provided in the workshops have been used in the respective high school classes to supplement their studies in A & P. A final example of a |
| Obj. 3.2 Expand ties to the community | Having hosted the Anatomical Demonstrations at the anatomy lab at SCC recently (May 3, 2014), we have received positive feedback from our guests (instructors and students of A&P at regional high schools). Our demonstrations continue to serve as enrichment to our high school colleagues and their students as well as showcase the college and resources available to graduating students. Although we plan to continue holding an annual Anatomical Demonstration at the anatomy lab at SCC, the faculty of pre-Health have expressed interest in developing a Career Fair similar to the one hosted by the Career Tech group at SCC. The purpose of the proposed Health Career Fair is: (1) To attract a broader group of high school students to SCC in order to show them opportunities available at their neighborhood college, Solano Community College, and (2) To inform the visiting students of career opportunities in the field |

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| | of Health as well as paths for pursuing these specific careers. Furthermore, in order to deepen our ties with the faculty at our area high schools, we are developing a program with our dissectors to demonstrate pig hearts and other viscera in the classrooms. This project has been initiated at A&P classes at Fairfield High School; we hope to be able to expand the project to other schools. Finally, we are exploring extramural funding of workshops to train A&P instructors and purchase specimens and supplies to support the study of A&P in the high school classrooms. Currently, these are the avenues that the pre-Health faculty members are following to strengthen our ties with the community. |
| **Goal 4: Optimize Resources** | **Program Evidence** |
| Obj. 4.1 Develop and manage resources to support institutional effectiveness | The anatomy, physiology and microbiology classes need a variety of resources to support institutional effectiveness including the extensive use of classrooms and equipped laboratories. Currently all classes offered at the Fairfield campus and Vacaville and Vallejo Centers are in general supported adequately. However, the anatomy laboratory needs to be updated. The fumes released by the chemicals used to prevent the specimens from decaying, are mostly removed by vents that have been installed decades ago. Measured levels of formaldehyde shows that we do not reach toxic concentration of this chemical. Levels of phenol, the other chemical used to prevent growth of bacteria and molds, have not been measured. Even if formaldehyde is apparently used not at toxic concentration, we should safeguard against potential health impact, and therefore, in order to support institutional effectiveness, we need to address the poor ventilation of the current anatomy lab either by updating the existing ventilation or by building a new laboratory. This is a necessary step to ensure a safe environment for teaching and learning. |

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| Obj. 4.2 Maximize organization efficiency and effectiveness | Materials necessary to support anatomy, physiology and microbiology classes include extensive chemical reagents, cultures, software and human cadaver specimens. All the material is currently provided to all classes. In order for this to happen there is a need for extensive technical help. One full-time technician prepares the physiology and microbiology laboratories (in addition to supporting all biology classes) at the Fairfield campus. In addition, one full-time technician supports all biology and chemistry classes at the Vacaville Center, and a separate full-time technician supports all of the science courses at the Vallejo Center. Anatomy is supported uniquely by the effort of the full time faculties teaching the class. Since 8-10 sections of anatomy are offered each fall and spring semester, a significant amount of time is spent with the following activities: ordering and receiving cadavers, models and needed chemicals; preparing solutions; keeping a detailed inventory of all specimens; and maintaining cadavers and prosected specimens. Overall this is the equivalent of the work of a part-time technician, and therefore the anatomy faculties, already busy teaching and writing a continuously increasing amount of assessments (SLOs and program review), feel that in order to maximize organization efficiency and effectiveness, it is necessary to hire a part-time technician devoted to the organization of the anatomy lab. This technician could also assist the full-time Biology technician at Fairfield since new labs for Bio 16 have been added, requiring more support. Additionally, as the Vacaville Center has developed, filled Biology and Physiology labs have placed a burden on the single Science technician at the Vacaville Center. In order to plan for future growth at the Vacaville Center, we need to make plans for hiring an additional part-time technician to serve the expanding Biology and Physiology labs. Also, we are planning to add a second anatomy lab at Vacaville Center in the future, and there will be additional growth of Biology offerings at this center after a new Science building is built. Thus, we need to plan for adding a part-time technician to support of Biology labs at the Vacaville Center. |

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| Obj. 4.3 Maintain up-to-date technology to support the curriculum and business functions. | At Solano College, Physiology instructors have updated the BioPac lab modules which are used in all sections of Physiology at the college. This update of software necessitated the upgrading of laptop computers for running the new BioPac programs. The college has recently switched from using e College to a Canvas platform. This transition has taken place in stages over the past 2 years. At SCC faculty members offering either an on-line or hybrid course are required to participate in a training course in Canvas to ensure that the on-line component will be of comparable quality to that of the same face-to-face course. To facilitate the training, Flex workshops have been offered throughout the 2013-2014 academic year under the supervision of our new Distance Education leader and staff. Although there was uncertainty associated with switching to a new platform, colleagues who have switched to Canvas have given mostly favorable reports on the use of this product. Yet another form of technological updating is taking place in the Anatomy lab, where the instructors have begun training in exercises using a recently purchased product, "On-line Guided Gross Anatomy Dissector", by C. Suarez-Quian, who has developed and successfully used the product to teach medical and graduate students for several years in gross anatomy at Georgetown Medical School. Although there is no substitute for hands-on dissection in the anatomy lab, we view the use of the on-line dissector as a valuable pre lab tool. To complement our use of the on-line dissector, we are exploring the idea of establishing an 'in house' gross anatomy review program over the next 3-4 years to assist new faculty in the refinement of dissection techniques and the expansion of the anatomical base of our Anatomy faculty. We have the cadavers, experience among the faculty, and lab availability during the summer months, so we are planning to begin our first review program during late July, 2014. Our first project will be to review the thoracic boundaries, contents, and dissection procedures required to open the thorax, followed by dissection of the contents. |

***1.3 Enrollment.*** Number of sections offered for each class is quite consistent from year to year. For Bio 004 (human Anatomy) we offered 10 sections in the Fall and 9 sections in the Spring, starting with Spring 2012 (we used to offer only 8 sections in previous Spring semesters). For Bio 005 (Human Physiology) we consistently offered 6 sections with the exception of 2012 when there were only 5 sections. For Bio 014 (Microbiology) we offered 5 sections in the Fall and 6 sections in the Spring with the exception of Fall 2012 when we offered 4 sections.

Student enrollment in these classes is good; however it shows a small decline between 2010 and 2014. When we analyze the enrollment in the individual classes we see that BIO 005 showed a small reduction in the number of enrolled students in the period 2011 and Spring 2014 but it shows a small increase in the number of students in the 2014 Fall semester. BIO 004 shows a

small reduction in students enrolled starting in 2012. Enrollment in BIO 004 was especially low in this last semester (Fall 2014). Enrollment in BIO 014 shows the most reduction, being especially low in this last semester (Fall 2014).

The average fill for these classes is very strong for both BIO 004 and BIO 005, but shows a trend towards a reduction for BIO 014 after 2012.

As a consequence of a small reduction in enrollment, FTES generated are also slightly reduced. The bigger reduction is observed in BIO 014 while a smaller reduction is reported for BIO 004 and no reduction for Bio 005. Similarly WSCH is in general reduced.

We think that the trend towards a reduction in student enrollment in these classes follows the trend towards a reduction in enrollment that is observed in general at Solano Community College. However, the reduction in enrollment in BIO 014 is much less (in the order of about 10 percent) than the reduction observed across the college (in the order of about 30 percent). Specifically, it seems that enrollment in BIO 005 is healthy, that enrollment in BIO 014 is steadily declining and that the enrollment in BIO 004 is not as strong as it used to be. We don't have as of now a clear explanation of why this is happening. One contributing factor could be the increase in the cost of units that was introduced in 2012. One other possible explanation for the declined enrollment is that BIO 014 is offered at multiple centers (Vallejo, Vacaville, and Fairfield) and enrollment at each campus can be affected by more local economic problems. The reduction in enrollment in BIO 004 in this most recent semester (Fall 2014) is a surprise to all anatomy instructors. We do not have a clear understanding of this phenomenon, but perhaps one contributing factor could be a recent turnover of faculties in anatomy due to the recent retirement of two senior anatomy professors. It will be interesting to see what will happen in the Spring 2015 semester.

In conclusion, we do observe a trend toward a reduction in student enrollment, trend that possibly is following the reduction in enrollment observed across our college. However, the filling of classes is still very healthy and the prospect of jobs that require these classes as a prerequisite is very good (see 1.6).

*Number of sections offered*

| | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014 |
|---|---|---|---|---|---|---|---|---|---|
| **Bio 004** | 10 | 8 | 10 | 8 | 10 | 9 | 10 | 9 | 10 |
| **Bio 005** | 6 | 6 | 6 | 5 | 5 | 6 | 6 | 6 | 6 |
| **Bio 014** | 5 | 6 | 5 | 6 | 4 | 6 | 5 | 6 | 5 |
| **All** | 21 | 20 | 21 | 19 | 19 | 21 | 21 | 21 | 21 |

*Number of student enrolled*

| | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014 |
|---|---|---|---|---|---|---|---|---|---|
| **Bio 004** | 275 | 255 | 316 | 250 | 284 | 258 | 263 | 265 | 252 |
| **Bio 005** | 166 | 153 | 166 | 135 | 144 | 157 | 139 | 155 | 170 |
| **Bio 014** | 135 | 174 | 146 | 175 | 128 | 136 | 124 | 131 | 108 |
| **All** | 576 | 582 | 482 | 560 | 556 | 551 | 526 | 551 | 530 |

*Full time enrollment equivalent (FTES) generated [(# of students per week*# class hours per week * 17.5)/525]*

| | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014 |
|---|---|---|---|---|---|---|---|---|---|
| **Bio 004** | 83.3 | 76.6 | 95.7 | 75 | 84.6 | 76.8 | 78.9 | 79.5 | 75.6 |
| **Bio 005** | 49.7 | 45.9 | 50.1 | 39.9 | 43.2 | 47 | 41.7 | 46.5 | 51 |
| **Bio 014** | 26.8 | 34.8 | 29.2 | 35 | 25.4 | 27 | 24.8 | 26.2 | 21.6 |
| **All** | 159.8 | 157.3 | 175 | 149.9 | 153.2 | 150.8 | 145.4 | 152.2 | 148.2 |

*Weekly Student Contact Hours (WSCH; number of students * class hours per week)*

| | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014 |
|---|---|---|---|---|---|---|---|---|---|
| **Bio 004** | | | 2970 | 2403 | 2547 | 2304 | 2393 | 2385 | 2250 |
| **Bio 005** | | | 1631 | 1269 | 1296 | 1409 | 1250 | 1395 | 1611 |
| **Bio 014** | | | 942 | 1080 | 768 | 810 | 744 | 792 | 636 |
| **All** | | | 5543 | 4752 | 4611 | 4523 | 4387 | 4572 | 4497 |

*Average Fill*

| | Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014 |
|---|---|---|---|---|---|---|---|---|---|
| **Bio 004** | | | 136.3 | 139.1 | 117.5 | 118.5 | 110.4 | 122.7 | 104.2 |
| **Bio 005** | | | 100 | 94 | 96 | 86.7 | 76.7 | 86.1 | 99.4 |
| **Bio 014** | | | 112.1 | 107.1 | 114.3 | 80.4 | 88.6 | 78.6 | 75.7 |

***1.4 Population Served.*** Ethnic and gender and age representations for Health courses are listed in the tables below. This is the first Health program review as a separate major, so there are no historical data. The population served in Health courses is predominately female especially when compared to the college as a whole. Our ethnicity and age demographics are similar to the college as a whole, although we serve a greater percentage of Asian students and a lower percentage of black students.

**Percentage of Students by Gender 2010-2014**

| Health | % | Solano College | Mean % |
|---|---|---|---|
| Male | 25 | Male | 40 |
| Female | 74 | Female | 58 |

**Percentage of students by ethnicity 2010-2014**

| Health Courses | % | Solano College | Mean % |
|---|---|---|---|
| White (non-Hispanic) | 30 | White | 32 |
| Black (non-Hispanic) | 10 | Black | 18 |
| Hispanic | 17 | Hispanic | 20 but rising |
| Asian | 29 | Asian | 17 |
| Native American | 3 | Native American | 2 |
| Other | 11 | Other | 9 |

**Percentage of students by age 2010-2014**

| Health Courses | % |
|---|---|
| Less than 18 | 0.3 |
| Between 18-25 | 58 |
| Between 26-30 | 14 |
| Between 31-35 | 8 |
| Between 36-40 | 5 |
| Between 41-45 | 3 |
| Over 46 | 2 |

Pre-health students are predominantly aged 18-25, which is typical of the college as a whole.

Conclusions:

Males and black (non-Hispanic) students are underrepresented in our program. There are several possible reasons why more women enroll in our program. Women represent a greater portion of the college enrollment in general (approximately 60 percent) and nursing in our culture has long been associated with women. Our culture tends to socialize woman as nurturers, and many see health care as a nurturing occupation. Many men also see nursing as a less "masculine" career. However, attitudes are changing and nursing has seen greater male involvement in the last decade. The reason for underrepresentation by black students is unknown.

***1.5 Status of Progress toward Goals and Recommendations. Report on the status of goals or recommendations identified in the previous educational master plan and program review.***

*Table 2. Educational Master Plan*

| ***2014 Educational Master Plan*** | ***Status*** |
|---|---|
| 1. Strategic Action: *Continue* to support the educational needs of Biology programs including health preparation, biology majors' transfer preparation, biotechnology program preparation, and general education biology courses. | Pre-Health continued to support the educational needs of students by expanding access, especially in physiology, updating teaching materials and equipment, meeting student demand for section availability, as facilities allowed.<br>Student access to BIO 005 Introductory Physiology has been increased with the addition of new facilities at the Vacaville campus.<br>Health and the School of Health Sciences have created Biology 160 Review of Scientific Principles of Pre-Nursing, a 2 unit course designed specifically to prepare students who are entering the Registered Nursing Program. This course focuses on science and mathematics topics that are critical to success for students entering an RN program. It provides a clinically pertinent review of select anatomy, physiology, nutrition, and microbiology topics for students entering nursing school. It is especially designed for students that have had an extended time period between finishing their pre-nursing requirements and entering nursing school. This course is taught by a panel of experts in the field. Case studies are extensively used in order to contextualize the material. This course was offered for the first time Summer 2014. |
| 2. Strategic Action: Expand offerings on the Vacaville and Vallejo campuses to meet the education needs of these communities, including the expansion of anatomy and physiology courses on the Vacaville campus, and offering more courses as hybrids and/or online. | At the Vacaville campus BIO 005 Introductory Physiology is now offered (as of Spring 2013) and the number of sections offered was increased to two (Fall 2014). One section of BIO 014 Principles of Microbiology at the Vacaville campus continued to be offered each semester 2011-2014. The Vacaville campus does not have the facilities to support anatomy. At the Vallejo campus the number of sections of BIO 014 Principles of Microbiology was usually two based, on current demand. The Vallejo campus does not have the facilities to support anatomy or physiology. Health does not offer classes online or as hybrids. |

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| 3. Strategic Action: Continue to evaluate and expand as appropriate the number of sections of impacted courses to meet demand as appropriate based on facilities availability. | Health continued to adjust section numbers based on apparent student demand and facility availability. However, without a waiting-list system it is not possible to quantify the demand. A waiting-list system is being adopted that will permit the demand to be assessed with greater accuracy.<br>Enrollment in BIO 005 Introductory Physiology has fluctuated between 80 and 95 percent of maximum enrollment.<br>Demand for BIO 004 Human Anatomy remained greater than section availability. The anatomy faculty continued to over-enroll each section. 137 percent of the section maximum was enrolled in 2011; 116 percent of the maximum was enrolled in 2014. More sections cannot be offered without new facilities.<br>The number of sections of BIO 014 Principles of Microbiology offered was adjusted each semester. Microbiology offered between 4 and 8 sections based on demand. Enrollment appeared to decrease when expressed as a percent of maximum from 109 percent in 2011 to 73 percent in 2014. |
| 4. Update laboratory equipment and techniques to reflect new knowledge and developments in this rapidly progressing field. | Microbiology has added laboratory activities that use modern techniques using electrophoresis and recombinant DNA technology. |
| 5. Strategic Action: Assess enrollment patterns and determine needs for additional hybrid and/or online offerings. | Health does not offer hybrid classes. About 50% of students favor hybrid offerings but our faculty feel that, due to the challenging subject matter, face-to-face instruction is necessary. |
| 6. Assess need for additional full-time Biology professors and make appropriate recommendations. | Two new full-time faculty members (anatomy and physiology) were hired to replace two retiring faculty members. |
| 7. Strategic Action: Maintain and expand co-or extracurricular activities often with interdisciplinary faculty for contextual learning, e.g., open labs in anatomy, physiology and human biology. | The anatomy faculty maintained 50-70 hours per semester of additional open lab study time for students to access materials outside of scheduled class times. These included additional weekend times preceding practical exams. - The physiology faculty offered weekly opportunities for students to study materials outside of regularly scheduled class times. Additional sessions before midterms and during weekends were offered to allow additional time to prepare for practical exams. Approximately 12 hours per semester. |

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| 8. Strategic Action: Continue hosting high school students to participate in the human anatomy laboratory enrichment demonstration. | Health continued to host local high school students for anatomical demonstrations. The following area high schools participated between 2011 and 2014: Armijo, Fairfield High, Rodriguez, Vacaville High, Will C. Wood, St. Helena High, and during most of the years Travis High & Dixon High. The attendance of these demonstrations has been good with between 100 and 200 students participating each spring. Additional high school guests have included Vacaville Christian High students (Jan, 2014), and students enrolled in a special enrichment program for Native Americans. |

*Table 3 Past Program Review Recommendations:*

| Program Review Recommendations (Previous Cycle) | Status |
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| 1. Add 2 full-time Biology technicians. Need technicians to support additional courses at Fairfield campus and Vacaville and Vallejo Centers. | Technician hired at Vacaville Center to support Biology/Chemistry courses and recent technician at Vallejo Center has become full-time position.<br>A vacancy for a full-time Biology technician at Fairfield campus will be posted Spring 15. |
| 2. Add more laboratories. Additional laboratories needed to<br>(a) meet student demand<br>(b) provide a safer lab environment for students, staff & faculty using the labs<br>(c) upgrade equipment/facilities to meet technological and academic changes biology in 21st century | (a) A new physiology lab (opened spring, 2013) has been added at the Vacaville Center; it is equipped with computers, software, physiology equipment, microscopes, and anatomical models.<br>The new Biotech/Science Building at Vacaville Center will include a new anatomy lab. This project has been initiated and is scheduled to finish in 2016. The new Science Building on the Fairfield campus will contain new anatomy, physiology, & microbiology labs. This project is in the planning stage and is scheduled to finish in 2018.<br>(b) The new labs are being planned to incorporate extra ventilation and provision of a separate dissection room to contain chemical fumes in a room separate from the teaching space. Also, additional hoods are being planned for each lab. We have made little progress thus far on improving health considerations and ventilation in room 306 and prep room (first requested in 2009).<br>(c) As the new labs are planned, we are including 'smart' technology for use in the lab and lecture hall. |
| 3. Installation of audio-visual teaching equipment in the anatomy lab to support the teaching of cadaver-based anatomy to sections of 30 students. | Aging Motic imaging systems for use with the microscopic slides need to be replaced in both the anatomy and physiology labs. |

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| 4. Develop and establish new review class for entering nursing students. | Completed Bio 160. It was offered for the first time during summer, 2014. |
| 5. Add more lecture space outside of building 300 at Fairfield campus | We are sorely strapped for finding suitable lecture space every semester. Additional lecture space will be available with the addition of labs in the 2 new buildings:<br>At the Fairfield campus (new Science Building in planning stage) and the Vacaville Center (Biotech/Science Building). |
| 6. Survey anatomy students as to biology background | Completed this task. During the first week of Bio 4 (anatomy), this information is collected from all of our enrolled students. See results in 2.12 |
| 7. Develop departmental guidelines for hiring and mentoring adjunct faculty. Hire FT microbiology and anatomy/physiology instructors. | This task has been initiated. To address the issue of the development of familiarity with cadaver anatomy, new adjunct and full-time anatomy instructors are encouraged to shadow an established anatomy instructor. Furthermore, an on-line dissector program has been purchased (ASSC grant) to facilitate the acquisition of cadaver-based anatomical skills. |
| 8. To strengthen our ties to the community | Continue with the Anatomy Demonstrations in the lab each spring, which serves regional high school anatomy/physiology instructors and students. |

***1.6 Future Outlook.*** The outlook for the requested and/or expected improvements described in Section 1.5, Table 3 above is good with the exception of the hiring of new well-trained Faculty. We have recently been faced with the problem of what seems to be a regional shortage of trained anatomists. While we have the administrative support and the financial ability to hire, we have not been able to find adequate candidates. We are therefore faced with the necessity to train new Faculty ourselves, and such Faculty will have to be willing to invest the unpaid time and effort that such endeavor requires.

The outlook for Health professions' outside market forces is excellent. As shown below the demand for several categories of workers reflects a great projected future need for Registered Nurses, Physical Therapists, Occupational Therapists and Physician's Assistants (Respiratory Therapy data N/A). A few of our students, especially those in the Honor classes are either very early Pre-Med students or Post-Baccalaureate students currently applying, and the outlook for Physician demand (not shown here) is also very good.

While some if these figures must be somewhat dependent on the success of the Affordable Care Act, they probably could stand alone just based on overall population increase, increase in the aging population and simply market attrition. We have recently experienced a small decline in Bio 4 enrollment, but it is too early to speculate on what the cause of that may be. We are waiting to see the enrollment numbers for Spring of 2015

**Occupational Projections of Employment (also called "Outlook" or "Demand")**

RN

| Area | Estimated Year-Projected Year | Employment | | Employment Change | | Annual Avg Openings |
|---|---|---|---|---|---|---|
| | | Estimated | Projected | Number | Percent | |
| California | 2012 - 2022 | 254,500 | 297,400 | 42,900 | 16.9 | 9,230 |

PT

| Area | Estimated Year-Projected Year | Employment | | Employment Change | | Annual Avg Openings |
|---|---|---|---|---|---|---|
| | | Estimated | Projected | Number | Percent | |
| California | 2012 - 2022 | 16,400 | 21,100 | 4,700 | 28.7 | 870 |

OT

| Area | Estimated Year-Projected Year | Employment | | Employment Change | | Annual Avg Openings |
|---|---|---|---|---|---|---|
| | | Estimated | Projected | Number | Percent | |
| California | 2012 - 2022 | 9,300 | 11,400 | 2,100 | 22.6 | 340 |

PA

[Top]

| Area | Estimated Year-Projected Year | Employment | | Employment Change | | Annual Avg Openings |
|---|---|---|---|---|---|---|
| | | Estimated | Projected | Number | Percent | |
| California | 2012 - 2022 | 8,300 | 11,100 | 2,800 | 33.7 | 430 |

***Program Level Outcomes – 2.1-2.4***

Since we do not award certificates or degrees we are not a true College Program. Not applicable.

***Student Learning Outcomes***

*2.5* SLOs for BIO 004, BIO 005 and BIO 014 have been established and they are updated yearly since 2010. For BIO 004 and BIO 005 there are well-established SLOs shared and assessed by full time and most adjunct faculty using common criteria. Faculty teaching these courses had meetings and established common rubrics to be used for SLOs assessment. SLOs and rubrics are shared also with adjunct faculty. BIO 014 SLOs have also been assessed consistently by faculty, improvement is needed in alignment between different sessions.

2.6 For BIO 004 and BIO 005 SLOs are satisfactorily well established and the assessment is well aligned among full time faculty.
For BIO 014 alignment of SLOs is in progress. For all classes we are making an effort to achieve 100 percent compliance of adjunct faculty. We will encourage and continue the practice of group discussion of SLO outcomes/changes.

2.7 In general faculty report positive outcomes from the SLOs assessment reflecting the fact that these classes have a well-defined curriculum and experienced instructors. However some changes have been introduced by some faculty such as:

-Additional specimens, plastic models of organs, posters have been acquired from 2010 until the present via ASSC grants to help with teaching and learning in the lab and at the tutoring center.
- The interaction with the tutoring center was increased leading to the addition of embedded tutors to the laboratory portion of BIO 004 starting in Spring 2012. This increased the amount of time each student had for help in the lab.

- Several instructors opted to the practice of giving several (5-11) essay questions to students before the lecture exam. Some of these questions are selected for the lecture exam and for the final. This practice allows students to better understand key concepts and to master writing skills in alignment with ILOs. Several instructors modified laboratory procedures to address specific SLOs, increased office hours to provide help, increased open labs and increased homework for exam practice.

***Curricular Offerings***

***2.8 Course offerings.***

BIO 004 5 Units: Human Anatomy
Course Advisory: SCC minimum Math standard, Eligibility for ENGL 001, BIO 016 is strongly recommended. BIO 004 is a study of the structural organization of the human body, from cellular to organismal level. Throughout the course, various types of instruction are used, including microscopic investigation of prepared slides of tissues and organs, gross (macroscopic) anatomical dissection, and examination of prosected human material. Formerly BIO 006. Three hours lecture, six hours lab.
Sections offered Fall 2014:

10 sections at Fairfield campus from 8am-9:50pm
No sections offered at other centers.

BIO 005 5 Units: Human Physiology
Prerequisite: A grade of C or better in BIO 004 and CHEM 001 or CHEM 010 or CHEM 051 Course Advisory: SCC minimum Math standard and Eligibility for ENGL 001. This course describes physiological and homeostatic mechanisms of the body systems in health and disease states. The laboratory relates structure to function, uses instrumentation to measure physiological variables, and enables students to critically evaluate functional status. Three hours lecture, six hours lab.

Sections offered Fall 2014:
4 sections at Fairfield campus: MWF 12noon, MW 5:35pm, TR 12:30 & 2:30pm
2 sections at VVC: TR 5:35pm, MW 12noon

BIO 014 4 Units: Principles of Microbiology
Prerequisite: A grade of C or better in CHEM 051, CHEM 10, or CHEM 1 and a grade of C or better in MATH 104 or MATH 114 or two years of high school algebra. Course Advisory: SCC minimum English and Math standards. The study of the morphology, physiology, genetics, taxonomy, and ecology of microorganisms. The course also includes principles of immunology, the control of microbes, and their relationship to disease. Laboratory exercises cover microscopy, staining, aseptic techniques, identification, and microbial growth among others. Three hours lecture, three hours lab.

Sections offered Fall 2014:
2 sections at Fairfield campus: TR 1:00pm, R 6:00pm
2 sections at VJO, 1 section at VVC

BIO 160 2.0 Units (now changed to 2.5 Units): Review of Scientific Principles of Pre-Nursing
Prerequisite: CONDITION OF ENROLLMENT: This course focuses on science and mathematics topics that are critical to success for students entering an RN program. 8 hours lecture. (4-week course).
1 Section offered for the first time in summer at Fairfield: WR 10am-2pm
BIO 160 is a new class offered for the first time in summer 2014. This was to fulfil a need to review basic medical sciences for students accepted into the nursing program but on a long waiting list. We are currently deciding whether to offer this class again in summer 2015.

2 sections of BIO 005 and BIO 014 were transferred to VVC from Fairfield. There have been no other changes to course offerings.

***2.9 Fill rates/Class size:*** Human Anatomy, Human Physiology and Principles of Microbiology all filled well between fall 2010- 2014. Human Anatomy (BIO 004) classes were consistently over-enrolled (average fill rate 122 percent average cohort size was 273). Both Human Physiology (BIO 005) and Principles of Microbiology (BIO 014) had lower fill rates (average fill rates were 90 and 94 percent respectively, with cohort sizes averaging 157 and 140 percent); the lower fill rates and cohort sizes compared to Anatomy is consistent with these courses

requiring students to have successfully completed both anatomy and chemistry.

Maximum classroom sizes are appropriate for Human Physiology (BIO 005) and Principles of Microbiology (BIO 014). The consistent over-enrollment of Anatomy (BIO 004) is due to the willingness of instructors to accept additional students, and not because classroom size maximum is not appropriate. Instructors are willing to over-enroll Anatomy because: (1) the number of sections that can be offered is limited by the availability of facilities, and (2) instructors do not wish to deny students the opportunity for study. This highlights our stated need for more Anatomy lab space to satisfy student demand.

**BIO 004 Human Anatomy**

| | F 2010 | S 2011 | F 2011 | S 2012 | F 2012 | S 2013 | F 2013 | S 2014 | F 2014 | *Mean* |
|---|---|---|---|---|---|---|---|---|---|---|
| Fill rate | 114% | 139% | 135% | 130% | 118% | 119% | 112% | 122% | 110% | *122%* |
| Class size | 275 | 267 | 326 | 250 | 284 | 259 | 269 | 265 | 266 | *273* |

Fill rates increased in Spring 2011 to 139 percent (from 114% in Fall 2010) and remained near 130 percent until Fall 2012 when they decreased to 2010 levels. Cohort sizes were relatively stable (averaging 273 students) with the exception of Fall 2011 when 326 were enrolled.

**BIO 005 Human Physiology**

| | F 2010 | S 2011 | F 2011 | S 2012 | F 2012 | S 2013 | F 2013 | S 2014 | F 2014 | *Mean* |
|---|---|---|---|---|---|---|---|---|---|---|
| Fill rate | 92% | 91% | 100% | 90% | 96% | 87% | 77% | 86% | 96% | *90%* |
| Class size | 166 | 165 | 180 | 135 | 144 | 158 | 140 | 155 | 173 | *157* |

Human Physiology fill rates varied between 77 percent and 100 percent of maximum enrollment from Fall 2010-2014 with no apparent trend. The number of students enrolled varied between 158 and 180 with no apparent trend.

**BIO 014 Principles of Microbiology**

| | F 2010 | S 2011 | F 2011 | S 2012 | F 2012 | S 2013 | F 2013 | S 2014 | F 2014 | *Mean* |
|---|---|---|---|---|---|---|---|---|---|---|
| Fill rate | 96% | 106% | 111% | 104% | 114% | 80% | 89% | 78% | 67% | *94%* |
| Class size | 135 | 179 | 156 | 175 | 128 | 135 | 125 | 132 | 95 | *140* |

Principles of Microbiology fill rates increased between Spring 2011 and Fall 2012, and then declined to 67 percent by

Fall 2014. Cohort sizes increased also between Spring 2011 and Spring 2012. Cohort sizes returned to 2010 levels and remained stable until Fall 2014 when cohort size decreases

### *2.10 Course sequencing:*

Many of the students enrolled in pre- Health courses begin their studies with the BIO 004, Human Anatomy; however, students can take BIO 014, Microbiology, after satisfying the Chemistry 10 requirement. Although there is no official prerequisite course for BIO 004,

students who have a weak background in Biology for any reason are strongly advised by the counselor and anatomy instructor to take an introductory Biology course, preferably BIO 016, (Introduction to Human Biology), or BIO 015 (Introduction to Biology). This approach offers students the opportunity to become familiar with anatomical terminology at a slower pace and to learn about basic principles of cell biology and the hierarchical organization of living things.

Students who are pursuing a pre- Health path are informed by course descriptions in the college catalog on-line, and by counselors and instructors that BIO 004 and CHEM 010 are prerequisites for BIO 005, Physiology. Both of these courses must have been successfully completed ('C' grade or better) prior to enrolling in BIO 005. Physiology instructors have indicated that this change of requiring BIO 004 prior to BIO 005 has improved the success rate in their BIO 005 course. Additionally, it is traditional to present the structure of organs and organ systems prior to discussing their function. Microbiology, BIO 014, can be taken as soon as the CHEM 010 course has been successfully completed. After finishing CHEM 010 and BIO 004 (Anatomy), students can proceed with BIO 005, (Physiology). Since during some semesters our BIO 004 classes fill completely, the rate-limiting step is gaining entrance to BIO 004 (Human Anatomy). We cannot offer any additional sections of BIO 004 without having a second anatomy lab and hiring faculty who are trained in cadaver-based anatomy, to teach additional sections of Bio 4.

### *2.11 Basic Skills (if applicable).* *N/A*

Our entry class BIO 004 has no prerequisites and the prerequisites for BIO 005 and 014 are not basic skills classes.

### *2.12 Student Survey.*

Student Survey Data Spring 2014:

**BIO 004**
80% of students were very satisfied or satisfied with the availability of Anatomy (BIO 004) classes.
8% were dissatisfied or very dissatisfied with the availability of Anatomy (BIO 004) classes.
The rest were neutral.

**BIO 005**
56% of students were very satisfied or satisfied with the availability of Physiology classes.
12% were dissatisfied or very dissatisfied with the availability of Physiology classes.
33% were neutral.

**BIO 014**
50% of students were very satisfied or satisfied with the availability of Microbiology classes.
8% were dissatisfied or very dissatisfied with the availability of Microbiology classes.
41% were neutral.

**Class Times** Survey:
60% of students preferred morning (8 or 9am) start times.
25% preferred evening start times.
7% preferred afternoon classes.

**Weekend Labs** Survey:

43% would attend Saturday morning labs.
11% would attend Saturday afternoon labs.
46% would not attend Saturday afternoon labs.

**Evening Start Time** Survey:
50% preferred 5pm start.
15% preferred 5:30pm start.
27% preferred 6:00pm start.
9% preferred 6:30pm start.

**Hybrid Class** Survey:
52% would take a hybrid class.
48% would not take a hybrid class.

**Science Learning Center** Survey:
84% would use a science/biology learning center.
16% would not use a science/biology learning center.

**Repeat Classes**: Data from Research and Planning (2010-14)
20% have repeated Anatomy.
20% have repeated Physiology.
15% have repeated Microbiology.

Conclusions from student survey related to current course offerings/times:

It appears that students are very happy with our offerings in anatomy but a little less satisfied with offerings in physiology and microbiology. Many more students were neutral on availability of these classes. This may imply that students are somewhat satisfied with these offerings, but there is room for improvement. Some students would like anatomy to be offered at other centers. At Fairfield we are at our maximum for possible offerings in anatomy and we cover all available time slots. To address these needs the new Biotech/Science Building at Vacaville Center will include a new anatomy lab. This project has been initiated and is scheduled to finish in 2016.

The new Science Building on the Fairfield campus will contain new anatomy, physiology, & microbiology labs. This project is in the planning stage and is scheduled to finish in 2018.

The percentage of students who are interested in a hybrid course format is about 50/50. In view of the challenging nature of the curriculum in these 3 classes faculty do not recommend this format. The repeat rate for all three classes is similar. Currently for anatomy (Bio 004) there is a course advisory to take Bio 016 which covers some of the same material at a non-majors level but many students do not take this class. Our previous research shows that those students who took Bio 016 before anatomy have the same success rate as those who did not take it.

### *2.13 Four-year articulation.*

Pre- Health's three primary courses (BIO 004 Human Anatomy, BIO 005 Human Physiology, and BIO 014 Principles of Microbiology) all articulate with UC and CSU four-year institutions.

BIO 160 Review of Scientific Principles of Pre-Nursing does not, as this is a special course only offered to students who have been admitted to a Nursing Program.

***2.14 High school articulation*** (if applicable). *Not applicable.*

***2.15 Distance Education*** (if applicable). *Not applicable*

***2.16 Advisory Boards/Licensing (CTE)*** (if applicable). *Not applicable*

***Student Equity & Success***

***3.1 Course Completion and Retention.***

The Pre-Health group makes great use of the College's Tutoring Center as the main source of student support. We have a great ongoing relationship with the Center: they provide both in-Center and embedded tutors and we have a commitment to maintain their study aid collection up to date via grants, donations and purchases (see Paragraph 1.2, Objective 1.1 of this document). We have introduced several online and technological tools (see Paragraph 1.2, Objective 1.1 of this document). We work with the Counseling Department and DSP as the need presents itself. While we reach out to the community by organizing and staffing student outreach sessions, the nature of our classes (Human Anatomy especially) does not lend itself to community enrichment per se. Our strength is in the extensive educational, research and clinical background of our Faculty.

The success (completion) and retention data for Pre- Health from 2009-2010 to the most recent full academic year are reported in the Table 1. Below. The small summer sessions as well as the smallest groups, representing less than 8 percent of our student population, are not shown.

It is obvious from the data that there is no difference in success or retention where gender is concerned.

Ethnicity does play a significant role in the number of students that the class with a passing grade (succeed), with lines clearly drawn: Whites (79percent) > Asian/Pacific Islanders (73percent) > Hispanic (67percent)> Blacks (58percent). Retention is only lower for the African American group (80percent vs. 87-89percent), indicating perhaps that discouragement plays a big role in the group's lack of success. While an analysis of the area's ethnic mix and the associated socio-economic status is beyond our review here, perhaps we can learn to give more encouragement and instill more of self-confidence where less exists. While we can't change where a student has been, the shortcomings of primary and secondary education, and difficult socio-economic conditions, we can certainly try harder to influence their future.

Success (completion) data are lowest (68percent) for the younger age group (18-25), which is understandable in terms of the fact that older students often have a significant prior academic background (some have Bachelor and even more advanced degrees and are simply looking for a career change, for example). Simple maturity may play a role also, since BIO 4, 5 and 14 require quite a bit of self-discipline and good time management. Retention rates by age group are fairly comparable.

**By GENDER:**

| | % of total | Success | Retention |
|---|---|---|---|
| **Female** | **74 %** | **72 %** | **88 %** |
| **Male** | **25 %** | **71 %** | **87 %** |

**By ETHNICITY – main ethnic groups**

| | % of total | Success | Retention |
|---|---|---|---|
| **Asian/Pacific Islander** | **29 %** | **73 %** | **89 %** |
| **Black Non-Hispanic** | **10 %** | **58 %** | **80 %** |
| **Hispanic** | **17 %** | **67 %** | **87 %** |
| **White Non-Hispanic** | **30 %** | **79 %** | **89 %** |

**By AGE- main age groups**

| | % of total | Success | Retention |
|---|---|---|---|
| **18-25** | **58 %** | **68 %** | **87 %** |
| **26-30** | **14 %** | **76 %** | **89 %** |
| **31-35** | **8%** | **79 %** | **90 %** |

***3.2 Degrees/Certificates Awarded*** (if applicable). Not applicable.

### *3.3 Transfer*

These data may exist for pre-Health courses, but have not been made available. It should be noted that students may not be aware that our course are transferrable to the UC and Cal State systems. We recommend that faculty include this information on their syllabi.

***3.4 Career Technical Programs*** (if applicable). Not applicable.

## *Program Resources*

### *4.1 Human Resources.*

Current staffing for the three classes that are part of this program includes:

- 3 full time instructors teaching Human Anatomy (Dr. Itaya, Dr. Word, Dr. Molnar) and two part time instructors (Prof. Clark, Prof Nosce)
- 3 full time instructors teaching Human Physiology (Dr. Moore, Dr. Young, Dr. Summers) and two part time instructors (Dr. Bautista, Dr. Thomas A.)
- 3 full time instructors teaching Microbiology (Dr. DeKloe, Dr. Re, Dr. Thomas G.) and several part time instructors (Dr. Hefner-Gravink and Dr. Cattolica and others)

Enrollment in these classes is overall stable and we have been offering the same number of classes for the last 3 years. Staffing is difficult especially in Anatomy. In the last two years two professors retired and only one new full time professor was hired, Dr. Word. Overall the combined number of full time and part time faculty experienced in teaching Human Anatomy

with the use of cadaver is not sufficient to cover all the sections. In addition, Dr. Itaya will retire in the near future as well as Prof Clark will stop teaching as an adjunct (she is already retired and teaches as an adjunct). It is not easy to find faculty with the background and experience to teach our cadaver-based Human Anatomy course. Instructors with this type of background are usually employed in other more remunerative positions. Adjunct faculty have previously been trained by full time Anatomy instructors with a big investment in time from both parties. We would like to keep this tradition in order to avoid giving a class to an inexperienced professor. For these reasons, given an insufficient pool of adjunct professors and a declining number of full time professors, we absolutely need to hire, within the next year, at least one (or two) new full time professors to teach Human Anatomy and we need to expand the pool of adjunct professors able to teach the subject.
The current staffing for Physiology and Microbiology is appropriate. Considering the expansion at the Vacaville center and at the Fairfield Campus that will lead to the offering of more sections, we foresee in the next 4 years the need to hire more full time and adjunct professors for Human Anatomy, Human Physiology and Microbiology.

Additionally, in order to support our pre- Health courses, we need to hire a half-time technician to support our efforts in anatomy. This person could be shared with the other biology courses which also have generated the need for an additional technician to assist our sole biology technician at the Fairfield campus.

### *4.2 Current Staff contributions.*

During the past four years, two faculty members, M. Cristina Young and James Word, have been hired to replace two retiring instructors, John Nogue and Patrick Mallory, who had taught at Solano College for 32 and 22 years, respectively. The new faculty members teach in both physiology and anatomy courses, thus increasing our number of full-time faculty members to 4 each for anatomy and physiology. This increase in full time faculty has enriched the pre- Health courses offered at Solano College and provided more hands to do the work.

During the four years under consideration, there has been substantial improvement and addition of equipment used in the labs. All equipment upgrades have been the result of individual faculty efforts to apply for funding. Biology lab 305 has been equipped with an improved video microscopy station, which was purchased with Measure G funds. This microscopic station has been used not only for Biology courses but also it has been used by anatomy faculty.

Intramural grant proposals have been awarded to various faculty of this group during the past 4 years: (1) ASSC grants (2010-spring, 2014), which have allowed for the purchase of anatomical models, a light microscope, histological slides, anatomical charts, and skulls for use by students enrolled in Biology 4 in our anatomy lab as well as by Biology 4 and 5 (Human Physiology) students at the Solano College Tutoring Center; and (2) Strategic Proposal Grants in 2012 (P. Summers, G. Thomas, P. Itaya, M. Molnar, & C. Young), which have allowed for the purchase of Physiology transducers and other equipment, an autoclave, and additional models for use in the Physiology and Anatomy labs and the Tutoring Center.

Extramural grant proposals have been awarded to the pre- Health faculty (2013):

(1) Instructional Equipment Proposal, which allowed for the purchase of equipment for use in the dissection of cadavers (new Stryker saw, bone dust vacuum, and bone cutters) (P. Itaya, C. Young, M. Molnar, and J. Word) and a separate proposal for deionized water equipment (G. Thomas); and (2) American Association of Anatomists (AAA) Educational Outreach Grant (P. Itaya, 2013), which funded a Urinary/Reproductive Workshop at Solano College (2014) for Anatomy & Physiology instructors and selected students at regional high schools. The grant also purchased supplies for each instructor's classroom: kidney specimens, anatomical charts, microscopic slides, and dissecting tools. The AAA has funded a previous Cardiovascular Workshop at Solano College (2009), providing funds for the workshop and supplies for A&P instructors.

Recent Instructional Equipment Proposals which are under consideration for funding include: (1) Proposal to upgrade video imaging system in Physiology/Biology lab at the Vacaville Center (P. Summers); (2) Proposal to add to our anatomical collection in the Anatomy lab at the Fairfield campus (M. Molnar, C. Young, and J. Word); and (3) Proposal to purchase equipment to improve the ventilation problems existing in the Anatomy lab (P. Itaya and A. Eason). We are hopeful that some money will be provided to address some of our needs.

Sabbatical leaves have been granted to 2 pre- Health faculty members (spring 2011 and spring 2014). The former sabbatical leave resulted in the writing of a manual for Biology 15 course, and upon completion, the latter sabbatical product will provide a digital atlas of histological tissues for use, primarily in Biology 4, Human Anatomy.

Each spring during the past 4 years, the pre- Health faculty instructors have hosted an outreach project consisting of an anatomical presentation of major organ systems to regional High School Anatomy & Physiology instructors and their students. During the spring, 2014 anatomical demonstration, 150 students visited the lab with their instructors. This activity has been hosted by Solano College anatomy and physiology faculty for more than 20 years. It serves as enrichment for the students of A & P and instructors as well as introduces students to the pre-Health and Biology program at Solano College.

Various pre- Health faculty members along with colleagues in Chemistry and Math were involved in the planning of a new course Bio 160, which is a newly approved Pre- Health-Nursing bridge course. Although the course had been previously designed, it had remained in its early stages of development. In the summer of 2014 session, Bio 160 was offered for the first time. It was updated in coordination with the Nursing Faculty (C. Young), approved by the Curriculum Committee, and scheduled to be taken by admitted or wait-listed students in conjunction with the parallel Math 160 course. Bio 160 provides a review of Anatomy, Physiology, Nutrition and Microbiology, emphasizing the specific subjects that are the foundation for the understanding of pathophysiology and pharmacology.

Further activity of pre- Health faculty includes the ongoing development of new review courses: How to Study Science and Problem Solving in Human Physiology (designed to assist Bio 5 students in the understanding of difficult concepts in Physiology (R. Moore).
A new EMP project (the creation of a liaison committee between the Nursing School and basic Math, Science and pre- Health faculty) looks to maximize communication and optimize the

emphasis placed on prerequisite material to assure student success at every level along the path to Nursing and other Health professions (C. Young, J. Word).

Also, a new Book Club (R. Moore & B. Paschal) has been initiated at the Vacaville Center to capture students' interest in Science-related literature. This new club has recently been expanded to include students and faculty at the Fairfield campus.

Further evidence of the commitment of pre- Health faculty to realizing the mission of Solano College includes the following examples of recognition: (1) Award of 'Faculty of the Year', 2011 (J. DeKloe, Microbiology); (2) Service as Interim Dean of School of Sciences during academic year 2012-2013 (R. Moore, Physiology); (3) Service as Division Coordinators of SLOs/PLOs (G. Thomas, Microbiology, M. Molnar, Anatomy); (4) Presidential Excellence Awards in 2011 (J. DeKloe, R. Moore and E. Re), and in 2015 (Patsy Itaya and Cristina Young) and (5) Participation of all faculty members in incorporation of SLO evaluations into our courses. Faculty members of anatomy, physiology and microbiology courses remain committed to providing challenging courses that will provide our students with a strong background to prepare for future courses in the Health field.

### *4.3 Equipment.*

**Current Equipment used by the Pre-Health Program: See Appendix 1 at the end of this document**

**Future Equipment Needs: See Appendix 2 at the end of this document**

We use so much specialized equipment and supplies it is impossible to assess the effect of each item on student success. Suffice it to say that the continued and future success of students in our program depends on access to the up-to-date technology and instrumentation used in other community colleges and the medical professions. Our list of future equipment requests reflects our need to expand to new buildings and stay on par with peer colleges.

### *4.4 Facilities.*

The pre- Health sequence of courses is taught primarily in 3 labs located in the Science Building at Fairfield, labs 305, 306, and 307, as well as in newer labs at Vallejo Center and Vacaville Center.

Due to ventilation requirements of a cadaver-based anatomy lab, Anatomy, BIO 4, is taught in only one lab, room 306 at the Fairfield campus. This space limitation precludes the addition of more sections since our lab is fairly maxed out with the teaching of 20 sections of BIO 4 per year. In contrast, in addition to using the teaching labs (305 & 307) at the Fairfield campus, Physiology, BIO 5, is also taught in a new lab at the Vacaville campus, and Microbiology, BIO 14, is taught at labs at both Vallejo and Vacaville. These labs offer modern work spaces for students and a safer working environment that is expected in modern science labs. We have considered the design of these labs when planning for our new labs at the Biotech/Science Building at Vacaville Center as well as the future Science Building at the Fairfield campus.

Also, we are planning for a STEM Learning Center to be included in the new Science Building at Fairfield campus. Since the Science Building at Fairfield is in a very early stage of development, our considerations for the STEM Learning Center have been tabled for now.

There are 2 primary issues related to current facilities at the Fairfield campus:

(1) Our Biology labs are sorely in need of improvement as well as cleaning. Each of our Biology labs as well as the Chemistry labs needs to have a cleaning of venting units and filters as well as checking to make sure that there is adequate turnover of air in the lab to meet OSHA standards. This issue is keenly apparent during the last 60 percent of our BIO 4 labs during which cadavers and prosections are used on a regular basis from 8am- 9pm, Monday through Thursday and from 8am -6:30pm on Fridays. The chemicals, formaldehyde and phenol, are used in the embalming of the cadavers and for keeping the specimens moist during the lab, so plenty of harmful chemical vapors circulate in the air in lab 306. These chemicals are dangerous, with formaldehyde being classified as carcinogenic and phenol is known to be extremely caustic. Thus, adequate ventilation is essential for operating the anatomy lab. It is unacceptable for the college to turn a 'blind eye' to this problem.

While it is correct that space and safety issues will be addressed by the addition of a new anatomy lab at the Biotechnology /Science Building at Vacaville Center (opening, 2016) and the proposed Science Building at the Fairfield campus (projected opening, 2018), we need to give immediate attention to the ongoing problem of lack of adequate ventilation for any of our Biology labs. This is a safety issue which cannot be brushed aside while we wait for new labs to be built 4 years later at the Fairfield campus. We need to move forward with resolving this problem by scheduling for maintenance of the vents in these labs and testing the system for adequacy of turnover of air in each lab.

Grant proposals have been submitted which request the addition of a free-standing or bench top fume hood in lab 306 in order to provide a safely ventilated area for preparation and storage of our bottles of wetting solution and stock solutions of formaldehyde and phenol. Also, improved carts and storage containers have been proposed in order to more safely contain the chemical fumes generated by the use of prosections and dissection of cadavers. This is an ongoing need that is generated with the dissection of each new cadaver during fall and spring semesters, so a better system has to be employed. Progress has been made in increasing safety in the anatomy lab with the purchase (Instructional Equipment Grant 2014) of a vacuum system that collects bone dust. The system minimizes contact with particles of bone generated when operating an oscillating saw. Furthermore, during the planning stage of the Biotech/Science Building at Vacaville, faculty have made similar suggestions concerning the ventilation system in order to provide safe labs in the new building.

Related to the issue of adding safety measures to the current Biology labs is the proposal to add additional storage and defining a work station in the prep room for BIO 5. In order to provide a safe area in which different preparations for Physiology and Microbiology can be done, a dedicated work table in this space has been requested in a recent proposal.

(2) A second important factor that directly affects the teaching of Pre- Health courses is centered on the lack of adequate janitorial services to our labs. Due to the activities that take place in all of our Biology labs, the floors in the lab need to be swept and wet mopped on a

regular basis followed by a scheduled yearly steam cleaning, waxing and buffing of the floors. This is a safety matter rather than a cosmetic need because there have been a few incidents of faculty and students sliding on the oiled leaked on the floor of the prep room behind the anatomy lab, which could have resulted in injury. In order to coordinate the cleaning of the lab and prep room floors, the administrators of the college must work with the Facilities group. Although faculty and students using the labs have to be responsible for keeping work surfaces as clean as possible, we need support from the janitorial services to clean the floors on a regular basis.

Furthermore, we need a half-time technician to assist us in our many tasks related to operating a cadaver-based lab: ordering cadavers, maintaining the inventory list, keeping the prosections and cadavers wrapped and labeled properly, and ordering and preparing chemicals. These tasks are currently shared by the full-time anatomy faculty.

In essence, the issue boils down to the fact that we work hard in our labs on a daily basis and need a safe work environment. It is incumbent upon our supervisors at all levels of the college to make sure that we have a safe work space with adequate ventilation and janitorial service on a regular basis plus assistance from a half-time technician. This is what is required in order to continue to provide a high quality curriculum in Pre- Health at Solano College.

***4.5 Budget/Fiscal Profile*** - Not applicable.

## *Programmatic Goals & Planning*

### *5.1- Program Strengths and Major Accomplishments*

***A. Strengths of the pre-Health component of Biology:***

1. The great strength of the pre-Health component of Biology at Solano College is its well-qualified and well-trained faculty members and staff serving: Anatomy, Microbiology, and Physiology. Each brings his or her own personal style to benefit the students enrolled in the courses, takes pride in providing students with a solid academic course, and is committed to preparing students for their next academic step. These faculty members work cooperatively to uphold the academic standards set for the courses. The faculty of Microbiology and Physiology are supported by technicians who prepare agar plates and solutions and assemble slides and other material that will be used in the labs. The Vallejo and Vacaville Centers have tech support.

2. A second strength is that for each of the core courses in pre-Health, there is a strong lab component. Students are expected to actively participate in learning the material that is presented as a hands-on lab. In Microbiology and Physiology, students are taught methods of performing specific experiments, and in anatomy, students learn how to organize a large quantity of information and how to incorporate this information into their short-term and long-term memory circuits. We have established a record of success of former students, who have gone on to pursue their academic goals in competitive programs of study: BSN; PA (Physicians Assistant); PT (Physical Therapy); DO (Osteopathic Medicine); PharmD (Pharmacy); and other programs. There are shared reports of students being prepared academically to meet their short- and long-term goals.

3. We have been fortunate to receive funding from the School of Math/Science and Engineering over the years to purchase the equipment that is required in order to successfully conduct the lab component of our courses: quality compound microscopes and microscopic slides for each of the 3 courses; Biopac software and computers for conducting experiments in Physiology; funding to purchase 2 cadavers each year for use in Bio 4 and Bio 99. However, in order to supplement the budgeted funding from the division, faculty have been active in writing intramural (Strategic Proposals and ASSC grants) as well as extramural grants (Instructional Equipment Proposals, AAA Outreach Grants, and other sources) to allow for the purchase of additional models, microscopic slides, anatomical charts, autoclave, and de-ionized water system and other equipment to support experiments/labs conducted in Microbiology, Physiology, and Anatomy. Throughout the years considered in this review, each Dean of Math and Science has recognized the need for providing a generous budget to the pre- Health courses.

***B. Weaknesses of the pre-Health component of Biology:***

1. The pre- Health component's greatest weakness is current laboratory facilities in the 300 building at the Fairfield campus. Anatomy faculty and students teach/study in a lab with an inadequate ventilation system. The lack of adequate ventilation is most acute in the Anatomy lab during warm or cold weather. The ventilation system is required to be in operation as specimens are embalmed in formaldehyde and phenol; with the current ventilation system outside air is brought into the lab that cannot be conditioned. Each season (hot or cold) brings special challenges to faculty and students working in this lab space. The Anatomy lab also suffers from inadequate storage and insufficient janitorial support.

While it is correct that the proposed new Science Building at the Fairfield Campus will alleviate these problems provided attention is given to the construction of well ventilated labs, the new building will not be serving students until approximately 2018. Measures have to be taken now to try to correct the problems in our lab. Thus, faculty have addressed the on-going deficiencies of our lab by writing grants (Instructional Equipment Proposals) that, if funded, will allow for the purchase of: (1) a fume hood to provide a safe environment for preparation and storage of the solutions of formaldehyde and phenol, and (2) an improved storage system for housing our collection of prosected specimens. Faculty of the pre- Health courses must remain vigilant in monitoring the safety of our labs. The students, staff, and faculty deserve a safe teaching environment.

2. A second weakness of the pre- Health component is a lack of technical support. There is a real need for an additional technician who can work half-time to assist our 1 Biology technician at the Fairfield campus with demands of Microbiology and Physiology, and half-time technician to assist anatomy faculty in the many tasks that are associated with running a cadaver-based anatomy course: maintaining an updated inventory of our anatomical prosection collection; preparation of wetting solutions; wrapping and proper maintenance of prosected, anatomical material; ordering of cadavers each spring; and preparing for the return of anatomical material to representatives of UCSF Willed Body Program (usually in June each year). These are currently tasks which are undertaken by anatomy faculty in order for the program to run. However, these tasks are not part of the job description of the anatomy faculties. Anatomy faculty needs help from a half-time technician to support our varied activities.

3. A third weakness of the pre- Health component is a limited pool of trained adjunct faculty

from which to draw in case of a need to fill a vacancy. The skills needed to teach a cadaver-based anatomy course are not commonly possessed. It is often necessary to train new faculty to facilitate their ease of teaching in anatomy courses at Solano College. This is essential for maintaining quality in the anatomy program. In order to implement the training component, the Dean and the anatomy faculty must continue to support this concept and ensure that new faculty gains the training that is required. As we plan for the future retirement of faculty of Anatomy and Physiology, we need to be confident that there will be trained instructors available to fill the vacancies.

4. The fourth weakness is the absolutely unacceptable poor cleanliness of all labs and most of lecture rooms used for our classes. This is a campus-wide problem that includes the space used by this program. Faculty feel that it is mandatory to find a solution to this ongoing problem in order to immediately provide a better teaching environment for the pre- Health students, and in order to immediately improve overall SCC image and in order to maintain in a good condition the new buildings as they are going to be built on our campus. It is sad to see how the "new" building 400 is already showing the effects of a very low level of care, maintenance and cleanliness. It would be very sad to see the same happening to the buildings that are not built yet.

### *5.2 Short-Term and Long-Term Goals.*

*Table 8.*

| Short-Term Goals | Planned Action | Target Date | Person Responsible | Source |
|---|---|---|---|---|
| **1.** | Hiring and training new faculty to teach cadaver-based anatomy | January 2016 | Hiring Committee; Training of new faculty by Anatomy Faculty | DB<br><br>NR- Faculty will donate their time to train new faculty. Explore use of professional development funds to send 1 faculty member to short |
| **2.** | Hiring adjunct and FT faculty in Anatomy, Physiology and Microbiology to staff classes in new buildings at Vacaville. | January 2018 | Hiring Committee TBD | DB |
| **3.** | Improve facilities at Fairfield campus such as proper ventilation, storage of preserved specimens. | Fall 2015 | Patsy Itaya Submitted instructional equipment proposal, 11/14. Preparation of Strategic | Instructional Equipment funding proposal<br><br>Forthcoming SP |

| | | | | |
|---|---|---|---|---|
| | | | Proposal (SP) | |
| **4.** | Arranging for regular lab room cleaning by custodians. | Spring & Fall 2015 | Dean, Margherita Molnar, & Custodians | General College Budget |

| Long-Term Goals | Planned Action | Target Date | Person Responsible | Source |
|---|---|---|---|---|
| **1.** | Maintain a current pool of adjunct faculty who have been interviewed, so that the Dean can quickly hire recommended candidates at short notice. | January 2016 | Phil Summers<br><br>HR staff | NR- No extra funding needed |
| **2.** | Increase course offerings at VVC and VJO centers according to student demand. | On going | Faculty<br>Phil Summers | General Fund |
| **3.** | Secure funding to improve access to audiovisual technology in all teaching labs. | January 2016 | Patsy Itaya | Instructional Equipment proposal<br><br>Future SP development |
| **4.** | Improve student preparation and retention by developing and implementing a medical sciences basic skills course in conjunction with math and chemistry departments, e.g. creating a Bio 101, or Bio 35 | January 2016 | Faculty | General Fund and DB |

| | | | | |
|---|---|---|---|---|
| **5.** | Continue to work with Nursing and basic Math, Science to maximize communication and optimize the emphasis placed on basic science prerequisite material for BIO 5, and in turn on BIO 4, 5 and 14 prerequisite material for Nursing, to assure student success at every level along the path to Nursing and other Health professions. | On going | Faculty | NR- No extra funding needed |

The undersigned faculty in the pre-Allied Health program have read and concur with t
and recommendations in the attached program review self-study

Date: 1/30/15

James DeKloe
Faculty Name

Signature

Patricia Itaya
Faculty Name

Signature

Margherita Molnar
Faculty Name

Signature

Rennee Moore
Faculty Name

Signature

Ed Re
Faculty Name

Signature

Philip Summers
Faculty Name

Signature

Gene Thomas
Faculty Name

Signature

James Word
Faculty Name

Signature

Cristina Young
Faculty Name

Signature

**Appendix: 1 Current Equipment used by the Health Program**

This list is confined to durable items and does not include disposables.

**Bio 004 Equipment FF:**

3 Cadavers
3 Vented Cadaver Dissection Tables
Wall mounted ventilation systems
Prosections/ Parts
Dissection instruments Microscopes
Microscope Slides
Anatomical Models
Motic 2.0 Microscope Camera/Software

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**Bio 005/014 Equipment FF:**

BioPac hardware/Software Licenses (8)
Thermocycler 2
Gel electrophoresis chambers w combs 8
SDS-PAGE gel assemblies 4
Microwave oven 1
Plate/rotator table 1
Visible light lightbox 1
Microscopes 30
Mitosis models 8
Eye model 2
Ear model 2
Kidney model 1
Muscle model 1
Lung model 1
Heart model 2
Frog dissection model1
Female pelvic model 1
Male pelvic model 1
Spectrophotometers 8
Apple computer 1
Biopac equipment: includes MP30, 8
Lessons and Pro software, airflow,
blood pressure, stethoscope, hand dynamometer, hand switch, ECG,
EMG, EOG, EGG, EEG, headphones
Muscle Force transducers 6
Clinical centrifuges 2
Waterbaths 2
Refrigerator/Freezer 1
Autoclave 2

Laptops 20
Motic camera 1
Instructor's microscope 1
DVD/VCR player 1
Overhead projector 1
Refrigerator, double door 1
Refrigerator 2
Refrigerator/freezer 3
Incubator/shaker, large 1
Laminar flow hood 1
Colony counters 2
Small 37°C incubator 1
Double door incubators 2
30°C incubator 1
60°C incubator 1
Gel electrophoresis units, with combs 8
Power packs 4
Rechargeable electronic pipettor 1
Autoclaves 2
Hotplate/stirrers 2
Reverse osmosis water system 1
Gram scale 1
Antibiotic disc dispenser 1
Microscopes with 100x lenses 30
Microwave oven 1
Waterbath 2
Fume hood 1
"Flammables" cabinet 1
"Acids" cabinet 1
"Corrosives" cabinet 1
UV/visible light table 1
Plate/rotator table 1

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**Bio 004 Equipment FF:**

3 Cadavers: 3 in use each semester (1- 2 resting on shelves in prep room- 2 during summer months followed by 1 on shelf until Jan. of each semester when the 2nd cadaver is rotated to Table 2)
2 Shelf racks to hold the resting cadavers and some of the prosections: each shelf has 3 shelves
3 Vented Cadaver Dissection Tables- downdraft dissection tables
Wall mounted ventilation systems - 4.
2 Long stainless steel sinks: trough style
20-24 long stainless steel pans: trays for holding prosections in lab

20 individual 10" stainless steel pans:  for holding small prosections in lab
2 light boxes for viewing x-ray images: useful during bone/joint study
Prosections/ Cadaver Parts
Dissection instruments - (approximately ) 10 pairs of bad scissors; 8 pairs of good scissors this; 12 pairs of  forceps; 6 pairs of iridectomy scissors; need ~30 blunt probes at all times, 8-10 pair of hemostats, 2 boning knives, 12 scalpel handles (#4); boxes of scalpel blades, mallet, chisel, 2 Stryker, oscillating saws; 3 blades to use with the saws; cutting board for brain sections; 1 bone dust vacuum system; bone cutters (1-2 pairs that work.); extension cord; portable lamp; surgical spatula tool to help lift out the brain; 2 cross-cut saws for cutting through bones;
Containers for storing prosections, tissue remains, and limbs.
2-3 large, heavy duty Rubber Maid 55 gal containers
2 Carts to hold 55 gal containers:  on 'wish list' and requested with current Instructional Equipment Proposal
1 cart:  transport specimens of hearts, lungs, brains, etc. into lab
2 dozen wetting bottles:  to store wetting solution for use in lab
Tank table for storing lower limbs:  1 tank table
Cabinets for holding the prosections:  These need to be locking cabinets.:  length of bench top in prep room and over the sink
Microscopes (number?)- 31 Axiostar compound light microscopes: each equipped with 4X, 10X, 40X, & 63X objective lenses and 2 oculars (10X strength).  31 numbered in the original set (numbered 1/31, etc.) located in the cabinets, but also about 6 extra Placemats for the microscopes (1 per microscope-- matching set).
We need about 36 microscope stations set up for the first day of class each semester-- 30+  at the tables and 5-6 stations set up at the bench top closest to 305.  Outlets and extension cords necessary to set up 6 additional microscopes at bench top.
Microscope Slides (list?)- About 24-30 slides per tissue/organ-- We need to have at least 35 slides (good) or each tissue in our collection so that everyone can look at the same slide.  2 cabinets with multiple trays for storing microscope slides horizontally:  2 cabinets
Anatomical Models-
Heart models:  4
Brain models:  4
Coronal section of brain (shows gray matter, white matter)- real, embedded in plastic
Ventricular System plastic casts- 3
Plaque models of brains:  1
Female pelvis (sagittal section) models: 4 or maybe 5.
Male pelvis (sagittal section) models;  4 or maybe 5, same comment as above.
Standing  female pelvis:  1  (This one and the male equivalent model show the pelvis from iliac crest to proximal thigh.
Standing  male pelvis:  1  (See comments above.)
'Tilt a whirl' uterus, oviducts, & ovaries- 1 model showing various pathologies
Embedded female repro. system (uterus; oviducts; ovaries; related ligaments; vagina)- Somso models of kidney, renal lobe, and renal corpuscle (1 belongs to Physio.):  4, excellent quality models.

Plastic model showing Abdominal Aorta, branches of it, kidneys, Renal blood vessels, ureters, urinary bladder, prostatic urethra, prostate gland, seminal vesicle, vas deferens: 1 model
Plastic model showing arterial and venous blood supply of upper limb, including arterial branches and venous tributaries- 1 model
3-D model comparing structure of the wall of an artery, a vein, and a lymphatic capillary: 1 model
GI models:
Stomach- 1 model
Liver- 2 models
Duodenum, pancreas, & spleen model- 3 models
Liver model- showing classic hepatic lobule with portal triads, etc.- 2 models (used in Physio.)
Model showing histology of the wall of the GI tube from the esophagus to the anal canal- shows Mucosa through Serosa
Plaque model showing sagittal section through head, neck, demonstrating parts of respiratory and digestive systems- 1 model
Thorax model, showing heart and lungs (cut away view of lungs), pulmonary vessels, trachea, bronchi and bronchial tree, larynx- 1 plastic model
Larynx and trachea - 3 models
Models of joints/articulations:
Knee joint- 2 models
Shoulder joint- 2 models
Rotator cuff model- 1
Hip Joint- 2 models
Model of cranium with attached cervical vertebrae and showing Circle of Willis and components when the calvaria is removed: 1 model
Model of cervical vertebral column, demonstrating R & L Vertebral arteries traveling through the transverse canal : 1 model
Female bony pelvis: 2 plastic models
Male bony pelvis: 2 plastic models
Fetal skull: 1 plastic model
Color-coded, plastic models of skulls: 2 models
Plastic models of skulls: 13 plastic skulls (3 extra plus the ones belonging to the 10 sets of disarticulated skeletal bones, plastic
10 sets of disarticulated bones of the axial and appendicular skeletons
Plastic model of skeletal muscle fiber: 2 models
Plastic model of sarcomere: 1 model

Real bones:
Articulated Skeletons: 3 articulated, including the one in the cabinet, which could be moved to a new anatomy lab or not.
Skeleton needing articulation: 1 spread out over the top shelf in the prep room
Containers of real bones of every major bone of the body:

Radii, L and R:
Ulna, L and R:
Humerus, L and R:
Sternum:
Ribs, R and L:
Clavicles, R and L:
Articulated Hands: R and L
Coxal bones, R and L:
Femurs, R and L:
Tibias, R and L:
Fibulas, R and L:
Articulated Feet, R and L:
Articulated Vertebral column:
Loose vertebrae:
Calcaneus:
Talus:
Fetal articulated skeleton:
Fetal skull (real):

Elmo Imaging System: for viewing transparencies and textbooks/atlases
Installed Screen: for viewing transparencies, microscopic slides, and other projected images.
White board: Needs to be larger in current and new lab.
LCD projector
Functional computer
Motic 2.0 Microscope Camera/Software

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**Bio 005/014 Equipment VVC:**

Dell Laptops (#)
BioPac hardware sets/Software Licenses (8)
Force Transducers (6)
Thermal Cyclers
Models: Ear, Skull, urinary, liver, gallbladder, pancreas, renal system, hearts, eye, spinal cord, brain, muscle, pelvic models male/female, mitosis
Otoscopes, ophthalmoscopes, blood pressure cuffs, reflex hammers, tuning forks
Charts: body systems, vision charts, color blindness test books
Spectrophotometers
Water baths
Microcentrifuges
Colony counters
Table top shakers
Balances, student,
Hot plate/stirrers

Bench top incubator
Gel electrophoresis systems
Power supplies
Refrigerator/Freezer Revco RCRF192
Refrigerator double sliding door
Micropipettors
Glass pipettes and dispensers
Pan balance, prep room,
Shaker, Orbital, 16 x 16" non-incubated
Compound Microscopes
Lab carts
Blender

**Vacaville Lab Inventory (Shared area)**
Antibiotic Disk Dispenser
applicator, cotton-tipped, 6" wood shaft, non-sterile 1 pack
Autoclave bucket
Biopac sets 10
blade, scalpel, No.22, for No4 scalpel, pk/10 6
Carboy, 20L*
Carboy, 20L*
Carboy, 20L*
Carboy, rectangular, w/spigot, 9L 8
Carboy, w/spigot, 20L5
Carboy, w/spigot, 20L5
Carboy, w/spigot, 20L5
Cart Friction Pad
Case, Pelikan 1600 2
Cat, large, 18", plain preserved 1
Cell Set, electrochemical 30
Cell Spreader
Centrifuge, Laboratory 4
Centrifuge, Laboratory 2
Chart, Astigmatism Test 3
Chart, Snellen Eye Examination 3
cheesecloth mini WP 2
colony counter, Reichert 2
colorimeter 18
Comb, 10 well 8
culture tube, 16mm (rimmed) 1 cs/72
culture tube, 16mm (rimmed) 1 cs/72
Cutaneous Sensations Kit 2
cuvette, polystyrene, 4.5 mL capacity, disposable 1 case

cuvettes 5 boxes
cuvettes, 10 mm glass tube, 12/box 36
dispenser, label tape, write-on 2
Dissecting forceps, 4", offset tipped 4
DNA puzzle kit 8
ear model, 6 part, 3B 1
electrophoresis combs 8
electrophoresis packs 8
Electrophoresis Power Packs 4
First Aid Kit*
flat head forceps
forceps, curved 10
forceps, dissecting 20
forceps, flat square point 30
forceps, toothed 30
frog model, with stand, laminated key sheet, Altay 1
Genesys 20 8
glove, biohazard autoclave, orange 2
glove, exam, nitrile, Med, 100/bx 1
glove, exam, nitrile, Med, 100/bx 5
Goggles, safety 30
handle, scalpel, "Lock-on" No.4, 5 3/8" 30
hemacyctometer set , box w/ attached pipet bulb, red 5
hemacytometer
hot mitt 2
Hot Plate (red) 15
Hot Plate/Stirrer
human liver microanatomy, 2pcs, mounted, 3B 1
Individual DNA + Molecular Model kit 1
innoculating turntable 2
Innoculation Loops 24
Kidney model, Altay, 3pcs, mounted 1
micro centrifuge 2
micro spatula 12
microcentrifuge tube racks
Micrometer, Student 15
Microphone, Lab Pro 15
micropipet, 100-1000 uL 8
micropipet, 20-200 uL 8
micropipet, 2-20 uL 8
Micropipetter Rack 2
microscope pieces, Zeiss
microscope, Axio Lab A1 15

microscope, Axio Lab A1 15
Mini Protean Systems 2
model, Frog, dorsal & ventral dissections 1
model, Pancreas, w/spleen & part of duodenum 1
model, skull, 14 pc 1
model, Urinary organ 1
Molecular Models 20
oil, immersion, microscopy 30
optical lens cleaner, Fisherbrand 6
Optics Expansion Kit 15
Optics Expansion Kit 15
Orbital Shaker, Incubating, VWR 1
Ph meter, YSI 60 2
Pipet Washer
Pipet, 10mL* 100
Pipet, 10mL* 24
Pipet, 10mL* 36
Pipet, 1mL*
Pipet, 1mL*
Pipet, 1mL*
Pipet, 25mL*
Pipet, 25mL*
Pipet, 25mL*
Pipet, 2mL*
Pipet, 2mL*
Pipet, 2mL*
Pipet, 5mL 60
Pipet, 5mL*
Pipet, 5mL*
Pipet, 5mL*
pipetman
Pump, pipet, 10mL
Pump, pipet, 10mL 24
Pump, pipet, 10mL 14
Pump, pipet, 25mL 21
Pump, pipet, 2mL 24
rack, test tube, 20mm, half size, white 19
razor blade, single edge 200
ring, rod stand 13
scale, electronic 6
scale, portable, SLB301-US, 300g x .01g 6
Scalpel, Futura safety 50
scissors, dissecting 30

scoop spatula 36
Slant Rack
slides
small Animal Metabolism Apparatus 5
sparklighter single flint renewals 400
spatula, curved/straight, stainless steel, 5 in. 10
spatula, metal 36
Spectroscopes 9
Spirometer, "Spiropet" windmill type 8
spreaders
spreaders, bacterial cell, 25 mm 59
Spring Scale 4
Stir bar kit- 16 bars 1
stir bar retreiver, magnetic 3
stir bar, yellow, 2 inch (5cm) 20
Stirring rods 36
stop watches* 13
striker, gas 40
tape, label, 13mmx13m, 24 rolls/case 1
temp mitt, silicone 36
Test Tube Racks
thermocycler, Mastercycler Pro 1
thermometer, spirit 10
Thermometers
tray, plastic, white, 18 inch
tubing, dialysis, 100 ft 2
tubing, rubber, 1/4" x 12'
turn tables
UV lamps 8
Vortex Mixer 6
water bath 2
wire cutter, blue handle 8
yarn 2

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**Appendix 2: Future Equipment Needs**

**Anatomy (Bio 004) lab at FF campus:**
(1) Fume hood (free-standing or bench-top-- big enough to house all of the wetting solution bottles and stock solutions, so it would have to be a big bench-top model.
(2) 2 heavy-duty, leak proof, containers for storing dissected tissue remains and separate one to store upper limbs. Stainless steel if possible. 2 x 55 gal Rubbermaid heavy duty camp storage containers could substitute. ** Permeability to formaldehyde needs to be checked before purchase**
(3) A portable overhead lamp that hangs over the dissecting table (surgical lamp).
(4) Anatomical models: 2 hearts, 2 brains, 1 nephron (Somso), 2 liver models, 1 model of lungs or heart/lungs, male and female pelvis (1).
(5) 6-7 sets of hard bound Netter's Atlas of Anatomy (1/table for checkout).
(6) Upgrade of Motic microscope camera in 306 to include a wall-mount TV monitor.
(7) Surgical needs such as long handled scalpel
(8) Replacement Stryker blades.
Anatomical Charts: Eye, anterior and posterior chambers , Ear, organs of hearing and balance, Endocrine System

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**Bio 005 Lab at FF:**
2 x Force transducers for cardiac physiology labs.
8 x AFT 6 BioPac calibration syringes .
2 x BioPac SS2LB electrodes.

Bio 005 at VVC:
Audio Visual Upgrade in Room 110 VVC for Biology Labs: Bio 005, 014, 15, 003
Microscope Camera and Software $465.00
Flat Screen Monitor to display images/cables $764.58
New replacement micropipettors:
0.5–10 µl Digital Micropipet 166-0550EDU BioRad 135.00 8
2–20 µl Digital Micropipet 166-0551EDU BioRad 135.00 8
20–200 µl Digital Micropipet 166-0552EDU BioRad 135.00 8
100–1000 µl Digital Micropipet 166-0553EDU BioRad 135.00 8
DI water system replacement filters every year.
Microscope servicing every year

**Bio 005 at FF and VVC:**
14 BioCam Histology Wall Charts:
Blood cells wc05
Female reproduction wc15
Male reproduction wc16
Digestive system wc17
Urinary system wc18

Respiratory system wc20
Nervous tissue wc14

**Bio 014 at VJO**

| Item | Company | Catalog # | Amount | Quantity | Price/Ea | Total Price |
|---|---|---|---|---|---|---|
| slant trays | Marketlab | #ML1050 | ea | 4 | 295 | 1180 |
| pipette aid | Fisher | 12-654-100 | ea | 1 | 479.65 | 479.65 |
| Adjustable-Volume Pipettors | | | | | | |
| 20-200ul | Fisher | S98636A | ea | 4 | 282 | 1128 |
| 2-20 ul | Fisher | S98632A | ea | 4 | 282 | 1128 |
| Portable PA System with Wireless Microphones | Amazon | | | | | |
| | | | ea | 1 | 250 | 250 |
| | | | | | Total | 4165.65 |

DI water system filters:
1. ZF3000237 MAINTENANCE KIT LARGE RIOS/ELIX 169.10
2. PRPK0L0S1US PREPAK L1 PRE-SYSTEM PACK W/O 405.65
3. PR0GTL0S1US PROGARD TL1 PRETREATMENT PACK W/O 427.50
4. FTPF06805 TANK LEVEL SENSOR (100L) 629.85
5. ZLXUVLPL1 UV LAMP FOR TANKASM/RIOS/ELIX-L 233.70
6. FREIGHT Freight charges 38.00
Quote: ($) 1,903.80